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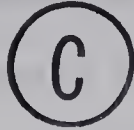
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THE UNIVERSITY OF ALBERTA
THE EDMONTON EDUCATION PRICE INDEX, 1957-1967

by

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A THESIS
SUBMITTED TO THE FACULTY OF GRADUATE STUDIES
IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE
OF MASTER OF EDUCATION

DEPARTMENT OF EDUCATIONAL ADMINISTRATION

EDMONTON, ALBERTA

FALL, 1969

1969/10
2

UNIVERSITY OF ALBERTA
FACULTY OF GRADUATE STUDIES

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled "The Edmonton Education Price Index, 1957-1967," submitted by Beverley Kent Ackroyd in partial fulfilment of the requirements for the degree of Master of Education.

ABSTRACT

The purpose of this study was to determine the degree to which the Alberta "Small Area" Education Price Indexes, developed by P. J.

Atherton in 1968, can be applied to the Edmonton Public School District.

The study was carried out in two stages. The first stage of the study involved developing a price index which measured price level increases of educational inputs purchased by the Edmonton Public School Board for the period 1957-1967. The second stage of the study compared the price relatives of the developed index with the index values of the Alberta "Small Area" Education Price Indexes. The comparison was made on the basis of percentage figures which represented the average annual increase in index values for each index during the period 1957-1965.

To compile the Edmonton Education Price Index six subindexes were developed, each of which represented a major category of educational goods or services. The subindexes and the final index were compiled by using Laspeyres' formula, which utilizes fixed weights and compares the price of a good or service in the base period with the price of the same good or service in another period.

The Edmonton Education Price Index suggested that price levels of educational inputs increased by some 65 per cent during the eleven-year period 1957-1967. An analysis of the major subindexes revealed that the price level of teachers' services increased to a greater degree than did the other major categories of input. During the period, 1957-1967, the price level of teaching services increased by some 77 per cent.

In the second stage of the study it was found that the price relatives of the Edmonton Education Price Index were quite similar to the index values of Alberta "Small Area" Price Index III. (Atherton

compiled Alberta Index III on the assumption that there are three utility levels in teaching services; teachers with less than two years of training, teachers with two years of training, and teachers with three or more years of training.) Both indexes increased at the average rate of some 4.5 per cent per year, and a total of some 41 per cent for the period 1957-1965. Thus, it was suggested that the third Alberta "Small Area" Index was an appropriate indicator for measuring increases in the price level of educational inputs purchased by the Edmonton Public School Board for the period 1957-1965.

It was also suggested that although current expenditures per unweighted pupil increased by some \$297.00 (106 per cent) during the period 1957-1967, real expenditures per pupil only increased by some \$70.00 (23 per cent). Thus, rising price levels accounted for 76 per cent of the increase in current expenditures per pupil. Further investigation revealed that the greatest increase in real expenditures occurred at the junior high school level, and the least amount of increase at the senior high school level.

ACKNOWLEDGEMENTS

Gratitude is expressed to Dr. P. J. Atherton, advisor and committee chairman, for his valuable assistance in selecting the research topic and for his expert counsel and supervision throughout all phases of the study.

Appreciation is extended to officials of the Edmonton Public School Board for their willingness to allow the writer access to the financial statements of the school board.

Appreciation is also expressed to the numerous individuals in industry and government who assisted the writer in collecting the data necessary for this study. Special thanks are expressed to Mr. W. Boyce, Director of Accounting and Budget, Edmonton Public School Board, for his valuable assistance in the initial stages of the study.

Finally, the writer expresses heartfelt gratitude to his wife, Patricia, for the sacrifices she made during the writing of this thesis, and for the encouragement and clerical assistance she provided.

TABLE OF CONTENTS

CHAPTER	PAGE
I. THE PROBLEM	1
Introduction to the Problem	1
The Nature of Inflation	1
The Measurement of Inflation.	2
Defects of General Price Indicators	4
The Alberta Education Price Index	5
Statement of the Problem.	5
Statement of the Sub-Problems	6
Definition of Terms	6
Assumptions	8
Limitations of the Study.	9
Significance of the Study	10
II. PROBLEMS OF INDEX NUMBER CONSTRUCTION	12
Introduction.	12
Problems of Quality Change.	12
Quality Change and Teachers' Services	13
Quality Change and Other Educational Inputs	20
Problems of Formula Choice.	21
Problems of Weight Choice	22
Problems of Base Year Choice.	23
Problems of Commodity Choice.	24
Problems of Price Data Selection.	25
Summary	26
III. RESEARCH DESIGN	30
Introduction.	30

CHAPTER	PAGE
Major and Component Subindexes.	30
Major Subindexes.	30
Component Subindexes.	31
Construction of the Major Subindexes.	32
Weighting Pattern for the Major Subindexes.	34
Components of the Major Subindexes.	39
Teachers' Services Subindex	39
Administration Subindex	39
Instructional Aids and Supplies Subindex.	41
Plant Operation and Maintenance Subindex.	42
Transportation Subindex	42
Other Expenditures Subindex	44
Final Index Construction.	44
Comparison of Price Indexes	45
Summary	46
IV. THE EDMONTON EDUCATION PRICE INDEX.	49
Introduction.	49
The Major Subindexes.	49
Teachers' Services Subindex	49
Administration Subindex	51
Instructional Aids and Supplies Subindex.	55
Plant Operation and Maintenance Subindex.	60
Transportation Subindex	65
Other Expenditures Subindex	73
The Final Index	77
V. COMPARISON OF THE PRICE INDEXES	81

CHAPTER	PAGE
Introduction.	81
The Major Subindexes.	81
The Teachers' Services Subindexes	81
The Administration Subindexes	85
The Instructional Aids and Supplies Subindexes.	87
The Plant Operation and Maintenance Subindexes.	89
The Transportation Subindexes	91
The Other Expenditures Subindexes	93
The Final Indexes	94
Implications.	99
Summary and Conclusions	101
VI. SUMMARY, DISCUSSION AND IMPLICATIONS OF THE FINDINGS.	105
Introduction.	105
Purposes and Design of the Study.	105
Summary of the Findings	107
Discussion of Implications.	109
Recommendations for Further Study	110
BIBLIOGRAPHY.	114
APPENDIX A: Data for Administration Subindex	117
APPENDIX B: Data for Instructional Aids and Supplies Subindex.	119
APPENDIX C: Data for Plant Operation and Maintenance Subindex.	124
APPENDIX D: Data for Other Expenditures Subindex	133
APPENDIX E: Correspondence with Dominion Bureau of Statistics.	135

LIST OF TABLES

TABLE	PAGE
I. Distribution in Years of Teacher Education, in Percentages	19
II. Major Subindexes, Component Subindexes, and Price Data for the Edmonton Education Price Index	33
III. Operating Expenditures of the Edmonton Public School Board, 1957-1967	35
IV. Breakdown of Administrative Expenditure of the Edmonton Public School Board, 1957.	40
V. Breakdown of Instructional Aids and Supplies Expenditure of the Edmonton Public School Board, 1957	41
VI. Breakdown of Plant Operation and Maintenance Expenditure of the Edmonton Public School Board, 1957	42
VII. Breakdown of Transportation Expenditure of the Edmonton Public School Board, 1957, 1962.	43
VIII. Breakdown of Other Expenditures of the Edmonton Public School Board, 1957-1959.	45
IX. Details of Construction of Teachers' Services Subindex.	50
X. Price Data and Price Relatives for Central Office Administrators and Clerical Staff.	52
XI. Details of Construction of Administration Subindex.	54
XII. Details of Construction of Instructional Supplies Subindex.	58

TABLE	PAGE
XIII. Details of Construction of Caretakers' Salary Component of the Plant Operation and Maintenance Subindex	61
XIV. Details of Construction of Fuel and Utilities Component of Plant Operation Subindex	64
XV. Details of Construction of Plant Operation and Maintenance Subindex.	66
XVI. Price Data and Price Relatives for Components of the Truck Operation Index	68
XVII. Details of Construction of Truck Operation Component of Transportation Subindex.	70
XVIII. Details of Construction of Transportation Subindex.	72
XIX. Details of Construction of Other Expenditures Subindex.	75
XX. Details of Construction of the Edmonton Education Price Index	78
XXI. Details of Comparison of Teachers' Services Subindexes, Alberta and Edmonton Education Price Indexes.	83
XXII. Details of Comparison of Administration Subindexes, Alberta and Edmonton Education Price Indexes.	86
XXIII. Details of Comparison of Instructional Aids Subindexes, Alberta and Edmonton Education Price Indexes.	88
XXIV. Details of Comparison of Plant Operation Subindexes, Alberta and Edmonton Education Price Indexes.	90
XXV. Details of Comparison of Transportation Subindexes, Alberta and Edmonton Education Price Indexes.	92

TABLE	PAGE
XXVI. Details of Comparison of Other Expenditures Subindexes, Alberta and Edmonton Education Price Indexes.	95
XXVII. Details of Comparison of the Alberta and Edmonton Education Price Indexes	96
XXVIII. Comparative Summary of Per-Pupil Expenditure, Edmonton Public School Board, 1957-1967	100
XXIX. Details of Construction of Communication Component Subindex.	118
XXX. Details of Construction of Price Subindex for Book Component of Instructional Supplies Subindex.	120
XXXI. Instructional Supplies Price Data.	121
XXXII. Details of Construction of Price Subindex for Supplies and Equipment Component of Instructional Supplies Subindex	122
XXXIII. Price Data and Price Relatives for the School Stenographer Component of Instructional Supplies Subindex.	123
XXXIV. Price Data and Price Relatives for the Power Component of the Plant Operation Subindex	129
XXXV. Details of Construction of Repairs Component of Plant Operation Subindex.	132

LIST OF FIGURES

FIGURE	PAGE
1. Annual Percentage Increases in Price Levels of Educational Inputs, 1958-1965	98

CHAPTER I

I. INTRODUCTION TO THE PROBLEM

Since the conclusion of World War II, inflation has been one of the most serious and persistent problems facing the industrialized countries of the western world. Although the general public is now aware of some of the consequences of inflation, many individuals fail to realize that inflation affects certain sectors of the economy more severely than others. Since the educational sector is one that is so affected, it was considered worthwhile to examine in some detail the changes that have occurred in the price levels of educational inputs. However, before making a formal statement of the specific problem which was investigated, it is necessary to provide a brief introduction to the problem of inflation.

The Nature of Inflation

For the purposes of this study, inflation is defined as ". . . a rise in the general level of prices" (1, p. 712). It should be noted that this definition of inflation does not refer to the movements of individual prices, but to the general level of prices. Consequently, the definition does not preclude the possibility that the prices of some commodities may remain stable or actually decline in a period when the general level of prices is increasing. Thus, in an economy that is characterized by an uneven movement of prices, inflation refers to the average rise in price levels.

Economists generally recognize two major types of inflation. The first type of inflation is "Demand-Pull" inflation, and is the result of excessive aggregate demand which, coupled with a shortage of goods,

forces both prices and wages to rise (2, p. 1). However, Schultze contends that since the early 1950's inflation stems not so much from excess demand "pulling" up prices, but from cost increases which "push" up prices (5, p. 103). This type of inflation, which is characterized by increases in wages and profits without accompanying increases in productivity, is called "cost-push" inflation.

The Measurement of Inflation

The customary way to measure changes in price levels is by means of price indexes. A price index is an average of prices, expressed as a percentage of some base period that is always given the value of 100 (5, pp. 92-93). Price indexes which measure the price movements of a number of goods and services are compiled on the basis of weighted averages. The weight assigned to specific goods and services is determined by the proportion of total expenditure devoted to the purchase of the goods or services.

There are four general price indexes which may be used as indicators for determining the extent of inflation in the Canadian economy as a whole, although there are other indexes which measure price changes in specific sectors of the economy. The four indexes are: The Consumer Price Index, the Price Component of Gross National Product, the Wholesale Price Index, and the Industrial Selling Price Indexes.

The Consumer Price Index is perhaps the best known of all Canadian price indicators. This index is compiled by the Dominion Bureau of Statistics and is described by them:

Specifically, the consumer price index measures the percentage change through time in the cost of purchasing a constant "basket" of goods and services representing the purchases made by a particular population group in a specified time period. The basket is an unchanging or equivalent quantity and quality of goods and

services. Only those goods and services which have a price . . . , and which can be priced continually over time can be included in the basket. . . . It relates to a broad but specific group of urban families. . . . (3, p. 8)

The Bureau of Statistics goes on to state that the family groups, upon which the consumer price index expenditure patterns are based, consist of families living in Canadian cities over 30,000 population, whose incomes range from \$2,500 per year to \$7,000 per year, and whose size ranges from two adults to two adults with four children (3, p. 8).

Although the consumer price index is perhaps the best known and most widely used indicator, the Price Component of Gross National Product (G.N.P.), often referred to as the "implicit price deflator" of G.N.P., is the most comprehensive indicator available in Canada. Not only does the implicit price index of Gross National Product measure price changes of all consumer goods and services, but it also measures price changes in government expenditures, new housing construction, new residential construction, new machinery and equipment expenditures, inventory investment, and the net effect of price changes arising out of transactions taking place in the international sector (4, p. 83).

The third major price index is the Wholesale Price Index. This index measures the changes in prices charged by manufacturers and wholesalers, and is compiled from price changes of about 2200 representative commodities (5, p. 92). However, Atherton points out that the importance of this index has declined since the advent in 1956 of the Industrial Selling Price Indexes (2, p. 4). These indexes, which are prepared by the Dominion Bureau of Statistics, measure changes in the selling price of about 3500 commodities classified by the Standard Industrial Classification. Atherton goes on to point out that these indexes ". . . refer only to manufacturing industries, and that selling prices may differ

from purchaser's prices because of addition of freight, insurance, and other charges" (2, p. 4).

Defects of General Price Indicators

The Economic Council of Canada, in its third annual report, warns that excessive reliance should not be placed on general price indexes when assessing the degree of inflation in the economy. The report states that general price indexes can at best, ". . . only give indirect readings of inflationary pressures in the system" (4, p. 78). Consequently, criticisms are often leveled against the usefulness of these price indexes.

One of the major defects of these general price indicators is that they only provide an indication of price level increases in the economy as a whole. They are not applicable to specific sectors of the economy, for example, public education. As John Vaisey points out, ". . . educational prices shift in a way which is not necessarily the same as that of prices in general" (6, p. 63).

Obviously, the Wholesale Price Index or the Industrial Selling Price Indexes are not adequate to assess the effects of inflation on educational inputs since they deal exclusively with manufactured goods. Atherton points out that the Consumer Price Index is inappropriate since it covers a wide variety of goods and services which have no counterpart in an educational budget (2, p. 6). The implicit price deflator also includes numerous commodities not relevant to the educational budget. Consequently, to obtain an accurate assessment of the effect of inflation upon educational expenditures, it becomes necessary to compile a price index, constructed specifically to measure changes in the price level of educational inputs.

The Alberta Education Price Index

Although a number of educational price indexes have been compiled in the United States, the only comprehensive educational price indexes compiled in Canada are the Alberta Education Price Indexes.

The Alberta Education Price Indexes, compiled in 1968 by P. J. Atherton, were of the fixed-base year, fixed-weight variety and were compiled using Laspeyres' formula. Each index was compiled from seven major subindexes which represented the major categories of expenditure for school systems in Alberta. Each subindex was weighted by the proportion of total expenditure devoted to each category in 1957.

Most of the data used in the compilation of Alberta Indexes were derived from federal and provincial government publications. Locally obtained price data were also used, although not to a large degree. Thus, since Atherton's study was conducted at a high level of aggregation, the findings cannot be automatically applied to an individual school district. As a result, to determine the impact of inflation on the educational inputs of a specific school district, it was necessary to compile a price index specifically for this purpose.

II. STATEMENT OF THE PROBLEM

The purpose of this study was to determine the extent to which Atherton's "Small Area" Education Price Indexes measured changes in the price level of educational inputs purchased by the Edmonton Public School Board. The Edmonton Public School District was selected since it is the largest single school district in Alberta, and accounts for over fifty per cent of the total operating expenditures of all small area school authorities in Alberta (2, p. 230).

This study was designed so that an answer could be obtained to the following problem.

To what extent are the index values of the Alberta "Small Area" Education Price Indexes, 1957-1965, representative of actual changes in the price level of educational inputs purchased by the Edmonton Public School Board?

The study was carried out in two stages:

1. The development of a price index appropriate for measuring the increases in price level of goods and services purchased by the Edmonton Public School Board, 1957-1967.
2. A comparison between price relatives of the Alberta "Small Area" Education Price Indexes and the Edmonton Education Price Index.

III. STATEMENT OF THE SUB-PROBLEM

This study was also designed to investigate the following sub-problem.

What are the similarities and the differences between price relatives of the Edmonton Education Price Index and the Alberta "Small Area" Education Price Indexes for the following subindexes:

1. The Teachers' Services Subindexes,
2. The Administration Subindexes,
3. The Instructional Aids and Supplies Subindexes,
4. The Plant Operation and Maintenance Subindexes,
5. The Transportation Subindexes,
6. The Other Expenditures Subindexes?

IV. DEFINITION OF TERMS

The following are brief definitions of the special terms used in this study.

Inputs. Inputs are goods and services purchased and utilized in

the provision of educational services. Services refer to the performance of duties (caretaking, teaching, clerical work) by various individuals, whereas goods refer to a variety of non-labor commodities (books, equipment, supplies, utilities, etc.).

Major categories of inputs are homogeneous groups of goods and services which are combined to provide separate services. They include administrative services, teaching services, instructional aids and supplies, plant operation and maintenance services, transportation services, and auxiliary services.

Component inputs are individual goods and services which may be included in one or more of the major categories of input.

Price Indexes. Price indexes are series of measurements, expressed as percentages, of the relationship between the average price of a group of goods and services at a succession of dates and the average price of a similar group of goods and services at a common date. The terms Major Subindex and Component Subindex refer to price indexes for major categories of input and component inputs respectively.

Index Numbers. Index numbers are the individual measurements that make up the price index. The measurements are also referred to as price relatives.

Base Year. The base year is the period of time that serves as the basis of comparison in an index. The base year used in this study was 1957.

Weighting. Since various commodities or groups of commodities do not represent equal importance in the expenditure pattern of a school district, it is necessary to consider the relative importance of each commodity or group of commodities. This is termed "weighting." The

weight, which is expressed as a decimal, is derived from a percentage that indicates the proportion of total expenditure devoted to each commodity or group of commodities in the base year.

Current Expenditure. Current expenditure refers to expenditure made without reference to the influence of changing price levels.

Real Expenditure. Real expenditure refers to expenditure which takes into account the changing purchasing power of money as reflected by changes in price indexes.

Small Area Authorities. Small area authorities are primarily urban school authorities for whom transportation expenses constitute less than fifteen per cent of operating expenditures.

Alberta "Small Area" Education Price Indexes. The Alberta "Small Area" Education Price Indexes are price indexes compiled to measure price level changes of educational inputs for small area authorities in Alberta, 1957-1965.

Edmonton Education Price Index. The Edmonton Education Price Index is a price index compiled specifically to measure price level changes of educational inputs for the Edmonton Public School Board, 1957-1967.

V. ASSUMPTIONS

In order to compile the Edmonton Education Price Index, it was necessary to make two basic assumptions.

1. It was assumed that increases in prices paid by the Edmonton Public School Board for goods were attributable to inflationary pressures and that the quality of the goods remained constant.

2. It was assumed that increases in prices paid by the Edmonton

Public School Board for services rendered were attributable to inflationary pressures and that the quality of services remained constant.

VI. LIMITATIONS OF THE STUDY

This study was limited to a study of price changes of goods and services purchased by the Edmonton Public School Board for the period 1957-1967. Consequently, the findings apply only to the Edmonton Public School District.

It is recognized that the degree to which the Edmonton Education Price Index reflects actual price changes of educational inputs was dependent upon the accuracy of the price data. It is, of course, vital that price data be as accurate as possible. In the Edmonton Education Price Index the net effect of random inaccuracies in price data on the final index was likely slight, if not negligible, for two reasons.

1. Exact price data were available for a number of inputs: teachers' salaries, central office administrators' salaries, caretakers' salaries, utilities, pupil transportation rates, and transportation allowances. These inputs accounted for approximately eighty per cent of the final index.

2. Price data for the remaining inputs were obtained from published data or by appropriate sampling procedures. As a result, it is possible that the price data for a specific commodity or group of commodities may have been slightly distorted from reality. However, since a relatively large number of commodities were used in the compilation of the index, it is unlikely that the price data for all commodities were erring in the same direction. Consequently, it is quite

probable that the errors largely offset each other, thus having little effect upon the final index.

Further discussion on the problem of price data selection is presented in Chapter II.

VII. SIGNIFICANCE OF THE STUDY

Atherton's doctoral dissertation was the first comprehensive study conducted in Canada to analyze the impact of rising price levels on expenditures for school operation. This study, which involved the compilation of the Alberta Education Price Indexes, indicated that rising price levels accounted for 74 to 82 per cent of the increased expenditures per weighted pupil, for the period 1957-1965 (2, p. 211). Further research was needed to determine if these findings were applicable to individual school districts. Atherton, realizing the need for further research in this area, made the following recommendation.

Because this study was conducted at a high level of aggregation it is possible that some specific effects of rising price levels were overlooked. It is suggested that indexes similar to those compiled for this study could be compiled for individual school districts and used in the analysis of specific problems.(2, p. 220)

The Edmonton Public School Board should find the index compiled for this study to be extremely useful in determining the extent of real increase in per pupil expenditure for the period 1957-1967. In addition, the Edmonton Education Price Index, if kept up to date, would serve as an aid in projecting future school board expenditures and in determining which area or areas of school operation require additional expenditures.

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CHAPTER II

PROBLEMS OF INDEX NUMBER CONSTRUCTION

I. INTRODUCTION

There would be few problems in measuring price level changes, and hence no need of index numbers, if all prices moved up or down in unison. However, since the prices of various commodities move quite differently, it becomes necessary to employ index numbers to measure the average percentage change of prices from one point in time to another.

Before index numbers can be accurately compiled, a number of problems must be solved. As a result, it is the purpose of this chapter to identify and discuss some of the major problem areas of index number construction.

Six major problems areas are discussed. They include: the problem of quality change of goods and services, the problem of formula choice, the problem of weight choice, the problem of base year choice, the problem of commodity choice, and the problem of price data selection.

II. PROBLEMS OF QUALITY CHANGE

One of the chief problems of index number construction is insuring that the commodities being priced in successive periods have the same quality. Wasserman, a noted authority on index number construction, describes this problem as one of the most difficult problems in compiling actual indexes (19, p. 26). Yet, to compile price indexes which accurately measure the price level changes of educational inputs, it is necessary to identify the utility-determining characteristics of the

inputs, and hold these characteristics constant in collecting price data. This can be an extremely difficult task, as is demonstrated by the consideration of teacher service inputs.

Quality Change and Teachers' Services

At the present time the price paid by the Edmonton Public School Board for a teacher's services is determined by the teacher's position on the salary schedule. The position on the salary schedule is determined by a combination of years of academic preparation and experience. Use of such a salary schedule seems to imply that training and experience are considered to be important determiners of teacher competence or quality.

Wasserman points out that accurate compilation of any index requires that utility-determining characteristics of inputs be identified and held constant in collecting price data (19, p. 26). Thus, when compiling an index for teachers' services a researcher requires research findings--or at least some assumptions--to determine the nature of the relationship between level of training and experience on one hand, and the quality of teaching service on the other.

Wasserman goes on to note that widely divergent points of view have been expressed as to the nature of the relationship between the quality of teacher service and the level of teacher training and experience (19, p. 32). One view is that the level of preparation and experience are not utility-determining factors; that is to say, there is no connection between quality of teacher service and level of preparation and experience. The other extreme position is that both level of training and experience are in fact utility-determining factors; hence salary increases resulting from these factors represent adjustments for higher quality of teacher service. In addition, a number of

other points of view can be taken that fall between the two extremes just presented.

For the purposes of this study, the first point of view was accepted; that is, it was assumed that there is no significant relationship between teacher quality and level of teacher preparation and experience. This position, although extreme, can be justified on two different bases.

1. A number of educational price indexes have been compiled in the United States and Britain. These indexes, with the exception of the comprehensive index developed by John Vaizey, made no attempt to take into account changing levels of teacher preparation and experience (1, pp. 48-58). As a result, the decision was made to follow the precedent established by these indexes, rather than attempt to identify and control for different levels of teaching quality.

It will be noted that Atherton, in compiling the Alberta Education Price Indexes, developed three salary subindexes which were compiled on the basis of different assumptions regarding the relationship between quality of teacher service and level of teacher preparation and experience. However these assumptions were operational assumptions, made only to determine the effect that quality assumptions have on the rate of price level increases, as measured by price indexes.

2. Although research evidence concerning the relationship between teacher quality and level of preparation and experience is inconclusive, many findings suggest that there is no significant relationship between the factors.

The following two sections present the findings of a number of studies, carried out in the United States and Canada, which support the

position that no significant relationship exists between quality of teacher service and years of preparation and experience.

Quality change related to teacher experience. The findings of the following studies support the assumption that there is no significant relationship between quality of teacher service and years of teacher experience.

Rolfe (14), after evaluating the teaching ability of fifty-seven Grade Seven and Eight teachers, gave the pupils validated tests on educational objectives before and after instruction on several units on citizenship. He made adjustments for pupils' individual differences in intelligence, in socio-economic status, and in initial achievement by means of a multiple-regression procedure. Thus, gains by the pupils were used to determine a teacher's efficiency. He found that there was little gain to attribute to increased experience.

Bathurst used the "Professional Tests for Elementary Teachers' Aptitude" to determine if age and teaching experience result in greater teaching efficiency. He found that after the first year, teaching experience had no relationship to the efficiency of a teacher. He therefore concluded that "we must look for factors other than age and teaching experience if we would find those which constitute teacher efficiency" (2, p. 316).

McCall and Krause (12) conducted a study which sought to measure the effect of years of teaching experience on pupil achievement. Their findings attributed more overall pupil growth to younger teachers than to older teachers and thus discounted experience as a favorable factor.

Strandberg conducted a study in Alberta which was designed to determine if a significant relationship existed between the character-

istics of Grade Nine Science teachers and the results obtained by their pupils on the Grade Nine Science Final Examination administered by the Department of Education in June, 1958. His findings indicated that class achievement actually decreased with an increase in the amount of teacher experience (17, p. 75).

Bodnaruk (1962) investigated the difference in pupil achievement (based on Grade Twelve final results) between the Ponoka school and the rural high schools in the County of Ponoka. Although the teaching staff of the Ponoka school had more academic training and an average of five years more teaching experience than the teachers in the rural schools, he found that there was no significant difference in pupil achievement (4, p. 83).

Quality change and professional training. There are a number of studies which have indicated that there is no significant relationship between teacher training and pupil achievement. One of the earliest studies was completed by Bergman in 1929 (3, p. 153). He used education tests with 14,000 students in the Michigan State Cooperative Testing Program and found no appreciable relationship between the number of years of teacher training and pupil achievement.

Davis (5, p. 101), in 1954, reported a study in which a negative correlation was found between specialized training of teachers and their pupils' scores in subjects other than chemistry. The tests used were the Minnesota State Board Tests of Pupil Achievement.

More recently, Schunert (15), also using the Minnesota State Board Tests of Pupil Achievement, studied pupil achievement in algebra and geometry. He found no significant relationship.

A Baltimore study conducted by Stephens and Lichenstein (16)

revealed a negative correlation between teacher preparation in arithmetic and class achievement. A number of Grade Five arithmetic teachers were used as subjects of the study. Class achievement was determined by a formula yielding a class-efficiency score and by taking intelligence differences into account.

A 1959 study, conducted by McCall and Krause (12), showed some positive but not significant correlations between the teachers' knowledge of the subject matter and pupil achievement.

A recent investigation in New York (9) indicated that pupil achievement was not related to such variables as the teacher's knowledge of professional education and the liberal arts.

Alberta researchers, investigating the problem of teacher training and pupil achievement, reached similar results. Klufus (10, p. 50) found no significant correlation between pupil achievement in Physics 30 and years of professional education of the teacher. Bodnaruk (4, p. 105) found that increased training of the teacher had no bearing on student achievement in Grade Twelve final examinations. Strandberg (17, p. 75) found that the relationship between mean class achievement in Grade Nine Science and the amount of professional education of the teacher did not reach the level of significance.

On the other hand, it is recognized that other studies have indicated that a significant relationship does exist between years of teacher training and pupil achievement, particularly when the training exceeded four years. Lindstedt, (11, p. 35) when investigating the relationship of professional training to pupil achievement, found that there was no significant relationship up to four years but that the amount of training was significant after four years. Teachers with five or six years of professional training obtained better pupil achievement

in Grade Nine Mathematics.

Other Alberta researchers, Tetley (18, p. 46), Eddy (6, p. 29), and Wasylyk (20, p. 57) also investigating the relationship between years of teacher training and pupil achievement, obtained similar results.

If in fact a relationship does exist, as the latter research studies indicate, then professional training determines two levels of teaching quality. An examination of the Edmonton Public School Board's teaching staff in terms of these levels revealed that the percentage of teachers with five or six years of training remained unchanged for the period 1961-1967. A breakdown is provided in Table I.

Table I shows that in the period 1961-1967, there was very little variation in the staffing pattern of the Edmonton Public School Board. During the seven-year period, the percentage of teachers with five or more years of preparation varied only slightly; from a low of 24.7 per cent in 1964 to a high of 26.3 per cent in 1961 and 1967.

Although such a breakdown was only possible for the years 1961 to 1967, there was no reason to believe that the percentage of teachers in each category would be any different for the years 1957 to 1960. Hence, in effect, the quality of the teaching staff remained constant for the entire eleven-year period, 1957-1967.

Wasserman points out that when such is the case, that is, when the overall staffing pattern remains unchanged during the period under consideration, ". . . the variables [quality of teacher service and years of preparation] would not matter in the index results" (19, p. 34). Consequently, even if the relationship suggested by the above studies does exist, for the purposes of this study, the relationship did not need to be considered.

TABLE I

DISTRIBUTION IN YEARS OF TEACHER EDUCATION
IN PERCENTAGES

Training	1961	1962	1963	1964	1965	1966	1967
1 year	32.1	29.0	24.9	20.0	14.9	12.3	9.7
2 years	14.2	14.9	17.0	19.3	18.7	18.5	17.9
3 years	7.1	6.9	7.2	9.7	10.5	10.6	10.8
4 years	20.3	23.2	24.7	26.3	30.1	32.6	35.3
Total	<u>73.7</u>	<u>74.0</u>	<u>73.8</u>	<u>75.3</u>	<u>74.2</u>	<u>74.0</u>	<u>73.7</u>
5 years	14.7	14.6	14.5	13.3	14.2	14.3	14.9
6 years	11.6	11.4	11.8	11.4	11.6	11.7	11.4
Total	<u>26.3</u>	<u>26.0</u>	<u>26.2</u>	<u>24.7</u>	<u>25.8</u>	<u>26.0</u>	<u>26.3</u>

Source: Edmonton Public School Board, Current Budget for 1968.

Quality Change and Other Educational Inputs

Services. A number of conceptual problems arose when attempting to define the utility determinants of nonteaching positions. For example, it was difficult to determine the extent that experience adds to the effectiveness of the nonteaching staff; or indeed, to determine if increased experience did actually result in added effectiveness. Because of problems of this type, it was assumed that increases in the price level of nonteaching services were attributable to inflationary pressures and that the quality of services remained constant.

It should be noted that since expenditures for teachers' services were much greater than those for nonteachers' services, the overall index was not affected to any great extent by the above assumption.

Goods. In order for an index to reflect only price changes, the price quotations being compared should apply only to those goods whose quality remained constant. However, when dealing with an eleven-year period, quality changes in educational goods are likely to occur. But, as Wasserman points out, quality changes in goods are not likely to have a significant effect upon the final index since the goods category as a whole accounts for a minor share of the overall index (19, p. 50). Because of this fact, and due to the difficulty of identifying and measuring quality changes of educational goods, for the purposes of this study it was assumed that increases in the price level of educational goods were attributable to inflationary pressures and that the quality of the goods remained constant.

It should also be pointed out that in this study the problem of quality change of educational goods was minimized, since an attempt was

made to choose a representative group of commodities whose quality remained constant for the period 1957-1967.

III. PROBLEMS OF FORMULA CHOICE

A great many formulae have been proposed and used in the construction of index numbers. Fisher, alone, analyzed 134 different formulae before arriving at a list of twelve which he considered to be acceptable. Out of this list the American Institute of Certified Public Accountants identify four of the most frequently used: Laspeyres, Paasche, Fisher, and a fixed formula that is a variation of the Laspeyres formula (13, p. 91).

Laspeyres' formula averages the change in the prices of fixed quantities of specialized commodities. The quantities are fixed because the formula holds the base period quantities or weights constant, and compares the price of a good or service in the base period with the price of the same good or service in another period.

The Paasche formula averages the change in the prices of changing quantities of specialized commodities. In other words, the current period quantity or weight is utilized to compare the price of goods and services in the current year with the price of the same goods or services in the base year.

The Fisher formula is a geometric average of the Laspeyres and Paasche formulae; hence both base year and current quantities are used as weights.

The Fixed-Weight formula is merely a variation of the Laspeyres formula. Although the formula averages the change in the prices of fixed quantities of specialized commodities, the quantities are from a

fixed period that is not the base period.

Atherton, faced with the problem of selecting a formula, decided that the Laspeyres formula was appropriate for compiling an education price index. His selection was based on the following criteria:

First, when used over a relatively short period, there would be little distortion of weights. Secondly, it would be possible to incorporate other series into the index since all major Canadian price index series are indicators constructed by the same method. Finally, . . . this approach has been one used in the development of previous education price indexes. (1, p. 47)

Laspeyres' formula was utilized in the compilation of the Edmonton Education Price Index for the same reasons.

IV. PROBLEMS OF WEIGHT CHOICE

The Laspeyres formula uses quantity data from the base period to determine the relative importance of each item in the total expenditure pattern. The major problem in this type of weighting is that the relative importance of a commodity or group of commodities may change over time, thereby rendering the base year weights inaccurate. This problem can be overcome to some extent by chaining bases or linking, but ". . . the caution must apply that too frequent changes in weighting may increase the accuracy of year-to-year comparisons, but reduce the analytic possibilities of the series as a whole" (1, p. 42).

Fisher suggests that weighting is a minor problem. He states that ordinary inaccuracy in weights will not produce appreciable effects because:

(1) any inaccuracy is not likely to be very great, such as 100 per cent . . . ; (2) if it does happen to be great it is not likely that, at the same time, the commodity to which it is attached will be very important or very erratic, much less both important and erratic; (3) if some of these things do conspire, there is still a good chance that opposite errors elsewhere will largely offset the effect; (4) even at the worst the effect is greatly reduced if a

list of 100 commodities might deviate from the general average 100 per cent without affecting the final result by one per cent. (8, p. 447)

Because of the relative unimportance of "weighting", Fisher goes on to state that rough estimates and even guesses are admissible in selecting weights (8, p. 448).

Compilation of the Edmonton Education Price Index presented few weighting problems. Laspeyres' formula was quite appropriate since the proportion of total expenditure devoted to each major category of input varied only slightly during the period 1957-1967. Hence the base year weighting system provided accurate price relatives.

V. PROBLEMS OF BASE YEAR CHOICE

The base year is important since it is the period with which all other periods are to be compared. If the prices or expenditure patterns in the base year are unusual or extreme, the resultant price index will be inaccurate. Atherton identifies three major requirements for the choice of a suitable base year (1, p. 37).

1. A period in which the number of comparable commodities found in both base and current period are as great as possible.

2. A period in which economic conditions are not extreme or unusual.

3. A base period close to that chosen for use in other series.

The base year selected for the Edmonton Education Price Index was 1957. The reason for this selection was that 1957 satisfied all three of the above criteria. It will be noted that in this study the third criterion was of particular importance, since the purpose of the study was to compare the Edmonton Education Price Index to the Alberta "Small

Area" Education Price Indexes, 1957-1965.

VI. PROBLEMS OF COMMODITY CHOICE

Collection of price data for every educational input is unnecessary as well as being a practical impossibility. As a result, in index number construction a sample of representative commodities is chosen to describe the group as a whole. Inherent in this practice is the assumption that the selected sample items are representative of the characteristics of the group as a whole.

The American Institute of Certified Public Accountants identifies two established methods of collecting a sample: (1) judgmental sampling, and (2) probability sampling (13, p. 85).

The choice of items in a judgmental sample is determined by an individual or group of individuals who are experienced and competent in the area of consideration. Although some of the best known indexes currently compiled are based on this type of information, there is no way in which a numerical value can be assigned to the degree of confidence that can be placed in the sample. It must be remembered that the accuracy of an index based on principles of this type is dependent upon the evaluation of knowledgeable specialists.

When probability sampling procedures are used, the choice of items is based on the mathematics of probability. The "chance of selection" of an item is determined by the number of possible selections and the importance of the item as indicated by the weight assigned to it. Because of the method of selection, personal bias does not affect the sample.

The problems of selecting commodities for inclusion in general

price indexes which measure price changes in the economy as a whole are quite severe. Such was not the case for the Edmonton Education Price Index. Sampling was not required for a great proportion of the inputs, since these inputs consisted of services rendered by teachers, janitors, central office administrators, school truck drivers, and clerical assistants. In the case of the few non-labor inputs, such as fuel and utilities or communication items, representative items were readily identified. When such was not the case, a judgmental sampling procedure was utilized.

VII. PROBLEMS OF PRICE DATA SELECTION

The problems of collecting price data were substantial. Information regarding actual exchange prices was not always available. Hence, it was sometimes necessary to use catalog, quoted, or list prices as the best available evidence of the exchange price. This may have resulted in an error in the index number, but this type of error is ordinarily of little consequence as long as the numerator and denominator are both biased (or "in error") in the same direction (13, p. 90). Furthermore, if the biases were proportionately the same in both the numerator and denominator, the resultant index number would be precisely accurate. Thus, in this study, use of published price data likely resulted in price relatives which gave a fairly accurate assessment of the actual changes in price level of educational inputs purchased by the Edmonton Public School Board.

Wasserman, in discussing the problem of price data selection, states that ". . . a dependence on published series is a matter of necessity if not choice for individuals or small groups compiling indexes

at the state or local level" (19, p. 28). He goes on to state:

For educational inputs or classes of inputs that show non-local patterns of price change, data that are already collected by governmental or private agencies could be used in place of data that would have to be collected especially for education price index purposes. (19, p. 54)

Fisher, after recognizing a need for accuracy in the collection of original price data, makes certain qualifications regarding the extent of accuracy. He estimates that in a group of 100 commodities, if each commodity is subject to an error of 10 per cent in either direction at random, the net resultant error in the index number would not exceed two and one half per cent (8, p. 341).

The Edmonton Education Price Index utilized published price data as well as original price data to compile the various subindexes. In each case, an attempt was made to ensure that the selected price data reflected accurate year-to-year price changes.

VIII. SUMMARY

Six of the basic problems confronting index makers have been presented. Among these problems the most serious and difficult to overcome was the problem concerning changes in quality. Since one single input--expenditure on teachers' salaries--accounted for the major portion of educational expenditure, considerable attention was given to the problem of quality change in the teaching staff. It was pointed out that since research evidence is inconclusive, the assumption was made that no significant relationship exists between years of training or experience and the quality of teaching service. It was also shown that even if a relationship does exist, as some studies indicate, for the purposes of this study the relationship did not have to be considered.

The problems of formula choice, weighting, choice of base year, choice of commodities, and price data selection have also been discussed. Since these problems were not as difficult to overcome as the problems connected with changes in quality, these problems were considered to be of less importance.

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CHAPTER III

RESEARCH DESIGN

I. INTRODUCTION

The purpose of this chapter is to describe the research design and the research procedures employed in this study. The chapter is composed of five major sections. The first section identifies the major and component subindexes of the Edmonton Education Price Index. The weighting pattern of the major subindexes is discussed in section two. Section three discusses the weighting pattern of the component subindexes. The steps involved in the final index construction are identified in the fourth section. Finally, the fifth section provides a discussion on the methodology employed in comparing the Edmonton Education Price Index to the Alberta "Small Area" Education Price Indexes.

The collection of price data for the various component subindexes is discussed in Chapter IV.

II. MAJOR AND COMPONENT SUBINDEXES

Major Subindexes

As stated in Chapter I, the purpose of this study was to determine the extent to which Atherton's "Small Area" Education Price Indexes measure changes in the price level of educational inputs purchased by the Edmonton Public School Board. To realize this objective, it was necessary to develop a number of major input categories which not only corresponded with the system of input classification used by the Edmonton Public School Board for reporting school expenditure, but which also corresponded to the input classification used by Atherton.

An examination of the annual financial reports revealed that the Edmonton Public School Board classifies current operating expenditures into five major categories: (1) administrative expenses, (2) instructional expenses, (3) operation of buildings, (4) maintenance of buildings and equipment, and (5) miscellaneous expenses. By making a few minor adjustments to this classification, it was possible to develop six major input areas. Thus, the Edmonton Education Price Index was compiled from the following major subindexes:

1. A teachers' services subindex,
2. An administration subindex,
3. An instructional aids and supplies subindex,
4. A plant operation and maintenance subindex,
5. A transportation subindex,
6. An other expenditures subindex.

With one exception, the above classification was the same as the classification developed by Atherton. Atherton's classification consisted of seven major subindexes: the above six subindexes, plus an unweighted index of nursing salaries called the Auxiliary Services Subindex. An auxiliary services subindex was not included in the Edmonton Education Price Index because health services were not an expenditure item of the Edmonton Public School Board. In the City of Edmonton the Health Department is responsible for the provision of health services to all public school students.

Each of the six major subindexes were compiled from a number of component subindexes.

Component Subindexes

Since each major category of input was composed of a variety of

goods and services, each of which varied markedly in the rate of yearly price change, it was necessary to compile a number of component subindexes for each major subindex. This was accomplished by first identifying the goods and services included in each major category of input, and then obtaining price data which indicated the pattern of price behavior for each good or service. From this information it was possible to compile the component subindexes. The methodology used for such compilation is discussed extensively in the latter part of this chapter.

The specific goods and services which were included in each major category of input are set out in Table II. Table II shows that with the exception of the Teachers' Services Subindex, each major subindex was composed of three or four component subindexes, and that each component subindex was compiled from price data obtained for a number of different commodities.

III. CONSTRUCTION OF THE MAJOR SUBINDEXES

The method of compiling the Edmonton Education Price Index was identical to the methodology Atherton utilized in compiling the Alberta Education Price Indexes. The index was compiled from six major subindexes, each of which represented a major category of the Edmonton Public School Board's annual expenditure. Each major subindex was in turn compiled from component subindexes. The overall index was of the fixed-base-year, fixed-weight variety and was compiled using Laspeyres' formula.

The remaining portion of this section discusses the weighting pattern which was utilized in the construction of the six major subindexes.

TABLE II

MAJOR SUBINDEXES, COMPONENT SUBINDEXES, AND PRICE DATA
EDMONTON EDUCATION PRICE INDEX

Major Subindexes	Component Subindexes	Price Data
Teachers' services	Teachers' salaries	Average teacher salary
Administration	Officials' salaries	Average official salary
	Clerical salaries	Average clerical salary
	Communication items	Postage, telephone, telegraph
	Supplies	Stationery
Instructional aids and supplies	Books	Text and library books
	Supplies & Equipment	Furniture, chalkboard, maps, machines, paper, globes, etc.
	School stenographers' salaries	Average stenographer salary
Plant operation	Caretakers' salaries	Average caretaker salary
	Cleaning supplies	Cleaning compounds, waxes, etc.
	Fuel and utilities	Natural gas, telephone rates, water and power
	Repairs	Labor, materials
Transportation	Transportation allowances	Rate per month
	Operation of trucks	Drivers' wages, depreciation, repairs, gas and oil
	Pupil transportation	Lease rates, bus tickets
Other expenditure	Taxes and local improvements	Labor, materials
	Insurance	Rates--fire, medical, life, unemployment
	Pension	Rates
	Miscellaneous	Fully and Chiefly Manufact- ured Goods

Weighting Pattern for the Major Subindexes

The weighting pattern for the major subindexes was derived from an analysis of the expenditure pattern of the Edmonton Public School Board for the base year 1957. The Annual Financial Report, 1957, of the Edmonton Public School Board contained the information required for this analysis.

Although use of the base-year weighting formula required that only the 1957 pattern be examined, the weighting patterns for the entire eleven-year period, 1957-1967, were examined to see if there had been a significant shift in the pattern of expenditure and to provide a check on the appropriateness of a base-year weighting system.

The first step in weight determination was to prepare an analysis of the operating expenditures of the Edmonton Public School Board for the eleven-year period 1957-1967. The results of the analysis are set out in Table III. An examination of the breakdown provided in Table III reveals that the pattern of expenditure remained relatively stable for the eleven-year period. Consequently, the use of the fixed base, weighted average of price relatives approach to index construction appeared to be appropriate for the compilation of the Edmonton Education Price Index.

The second stage in the determination of the weighting pattern was the conversion of the percentage breakdowns by each major category into weights. The weights were obtained by changing the percentage figures to a decimal.

Salary Subindex Weight. Table III indicates that expenditure on teachers' salaries accounted for 69.45 per cent of the current operating expenditures in the base year 1957. Although during the eleven-year

TABLE III
OPERATING EXPENDITURES OF THE EDMONTON PUBLIC SCHOOL BOARD
1957-1967

Year	Teachers' Salaries	Administration	Instructional Aids & Supplies	Plant Operation & Maintenance	Transportation	Other Expenditures	Total Expenditure
1957	\$5,672,953	\$249,452	\$428,187	\$1,531,374	\$35,147	\$251,431	\$8,168,544
%	69.45	3.05	5.24	18.75	.43	3.08	
1958	6,560,332	350,251	506,267	1,880,967	39,784	338,147	9,675,748
%	67.80	3.62	5.23	19.44	.41	3.50	
1959	7,665,421	375,003	574,583	2,356,690	40,640	312,508	11,324,845
%	67.69	3.31	5.07	20.81	.36	2.76	
1960	9,028,970	434,419	737,955	2,254,998	74,270	333,373	12,863,985
%	70.19	3.38	5.74	17.53	.57	2.59	
1961	10,299,111	442,332	830,862	2,303,274	86,875	344,015	14,306,469
%	71.99	3.09	5.81	16.10	.61	2.40	
1962	11,685,391	503,812	971,711	2,391,865	146,817	430,839	16,130,435
%	72.44	3.12	6.03	14.83	.91	2.67	
1963	12,807,874	542,222	1,164,299	2,490,612	180,576	477,370	17,662,953
%	72.51	3.07	6.95	14.10	1.02	2.71	
1964	16,302,441	680,143	1,584,092	3,275,519	329,065	550,209	22,721,469
%	71.75	2.99	6.97	14.42	1.45	2.42	
1965	18,193,552	740,746	2,038,098	3,549,029	465,316	601,676	25,588,417
%	71.10	2.89	7.97	13.87	1.82	2.35	
1966	20,531,940	960,293	2,628,569	4,245,429	601,141	964,835	29,932,207
%	68.60	3.21	8.87	14.18	2.01	3.22	
1967	23,772,869	1,200,364	3,376,990	4,676,990	726,376	1,149,506	34,902,878
%	68.11	3.44	9.68	13.40	2.08	3.29	
Average							
%	69.24	3.19	6.64	16.16	1.06	2.81	

Sources: Edmonton Public School Board, Annual Reports for 1957-1967.

period, the proportion of expenditure devoted to teachers' salaries experienced both periods of slight increase and slight decrease, the mean percentage for the eleven-year period (69.24) was extremely close to the percentage compiled for the base year (69.45). As a result, use of the base-year weight (.6945) was justified.

Administration Subindex weight. Table III shows that Administration, as a percentage of total operating expenditure in 1957, was 3.05 per cent. During the eleven-year period the percentages varied from a high of 3.62 in 1958 to a low of 2.89 in 1965. The average percentage for the entire period, 1957-1967, was 3.19.

The small amount of fluctuation in the above percentages justified the use of the base-year weight of .0305 to compile the overall price index.

Instructional Aids and Supplies Subindex weight. Table III shows that expenditures on instructional aids and supplies accounted for 5.24 per cent of all operating costs for the base year 1957. For the eleven-year period under consideration, the average annual percentage of total operating expenditure devoted to instructional aids and supplies was 6.64.

Since 1959 an increasing proportion of the total operating expenditure has been devoted to instructional aids and supplies. One of the major reasons for the percentage increase in expenditure is that since 1959 the Edmonton Public School Board has purchased yearly an increasing amount of equipment for special areas: industrial arts equipment, musical instruments, library equipment, science equipment, and equipment for special classes. This coupled with increased

expenditure in other areas has resulted in a small, but steady, yearly percentage increase.

It will be recalled that Fisher suggests that weighting is a minor problem, and that rough estimates and even guesses are admissible in selecting weights (4, p. 448). Consequently, even though the 1957 percentage was some 1.4 per cent lower than the average percentage figure for the eleven-year period, it was felt that the amount of variation was not great enough to justify rejection of the base-year weight of .0524.

Plant Operation Subindex weight. The percentage of total operating expenditure devoted to plant operation increased from 18.75 per cent in 1957 to 20.81 per cent in 1959. From 1959 to 1967 the percentage declined from 20.81 to 13.40. Again, it was felt that the amount of variation did not justify rejection of the base-year weight. Consequently, the weight given to the Plant Operation Subindex was .1875.

Transportation Subindex weight. As Table III indicates, the percentage of total operating expenditure devoted to transportation increased approximately six fold since 1959. The reason for this is that prior to 1960 "pupil transportation" was not included as an expenditure item in the annual financial reports of the Edmonton Public School Board.

On December 30, 1959, the City of Edmonton and the areas of Lendrum and Petrolia were joined through annexation procedures.¹ According to Mr. W. Robertson, Director of Operations, Edmonton Transit System, on September 1 of the following year the Edmonton Public School

¹Telephone conversation with the Filing Clerk, Research Section, Planning Department, City of Edmonton.

Board began to rent buses from the City of Edmonton to transport students from these new areas to established schools.² Since 1961 the number of buses the School Board rented increased tremendously in order to accommodate over-crowding in certain high schools, and to transport students to and from specialized schools.

In view of the fact that the proportion of total expenditure devoted to transportation was in any case small, price changes in this subindex would not have a significant effect upon the price relatives of the final index. Consequently, use of the base year weight (.0043) to compile the overall index was justified.

Other Expenditures Subindex weight. Table III shows that Other Expenditures, as a percentage of total operating expenditure, remained quite stable during the period 1957-1967. The relative importance of this category increased slightly from 3.08 per cent in 1957 to 3.29 per cent in 1967. This stability justified the use of the base-year percentage as the weight for the Other Expenditures Subindex. Thus, based upon the 1957 expenditure pattern, the weight for the Other Expenditures Subindex was .0308.

Summary. The method of weight determination for the major subindexes has been described and justified. The following summary presents in a succinct form the weighting pattern of the major subindexes. For comparative purposes, the weights for the major subindexes of the Alberta "Small Area" Education Price Index are also presented.

²Telephone conversation with Mr. Robertson.

	Edmonton	Alberta
Teachers' Services Subindex	.6945	.710
Administration Subindex	.0305	.028
Instructional Aids and Supplies Subindex	.0524	.046
Plant Operation and Maintenance Subindex	.1875	.181
Transportation Subindex	.0043	.009
Other Expenditures Subindex	.0308	.024
Auxiliary Services Subindex	-	.002
Total	<u>1.0000</u>	<u>1.000</u>

IV. COMPONENTS OF THE MAJOR SUBINDEXES

This section presents and discusses the weighting pattern utilized in the construction of each major subindex.

Teachers' Services Subindex

Because of the assumptions made concerning the relationship between years of training and experience on one hand, and the quality of teaching service rendered on the other, the Teachers' Services Subindex was based upon the average annual salary of all teachers in the Edmonton public school system. This one component accounted for 69.45 per cent of the overall index.

Administration Subindex

Administration, as defined by the annual financial reports of the Edmonton Public School Board, consisted of expenditures made for central office administration. This category included such inputs as official and clerical salaries, telephone and telegraph, stationery and office supplies, office equipment, and a miscellaneous item for other expendi-

tures.

Component weights. An examination of the 1957 auditor's report revealed that 97.8 per cent of administrative expenses could be placed in four categories: officials' salaries, clerical salaries, communication items, and office supplies. This classification remained stable throughout the period 1957-1967.

To derive weights for the four components, a percentage breakdown was compiled from the 1957 auditor's report. Table IV shows the breakdown and the resultant weighting pattern that was used for each component of administrative expenditure. On the basis of the analysis provided in Table IV, the component weights for the Administration Subindex are as follows: clerical salaries .6933, officials' salaries .2234, communication items .0419, and office supplies .0414.

TABLE IV
BREAKDOWN OF ADMINISTRATIVE EXPENDITURE OF THE
EDMONTON PUBLIC SCHOOL BOARD 1957

Component	Expenditure (1)	Percentage (2)	Weight (3)
Clerical salaries	\$168,826	69.33	.6933
Officials' salaries	54,399	22.34	.2234
Communication items	10,191	4.19	.0419
Office supplies	10,078	4.14	.0414

Source: ¹Edmonton Public School Board, Annual Financial Report, 1957.

Instructional Aids and Supplies Subindex

For the purposes of this study, instructional aids and supplies were defined to include all equipment, supplies, and services (other than teachers' services) that directly facilitate classroom instruction.

The format used in the annual financial reports of the Edmonton Public School Board made it possible to break down this category of inputs into three major components: books, supplies and equipment, and school stenographers' salaries.

Component weights. An analysis of expenditure on the components of the Instructional Aids and Supplies Subindex is set out in Table V. On the basis of this analysis, the component weights which reflect the percentage of total expenditure on each component, are as follows: books .3005, supplies and equipment .4617, and stenographers' salaries .2378.

TABLE V

BREAKDOWN OF INSTRUCTIONAL AIDS AND SUPPLIES EDMONTON PUBLIC SCHOOL BOARD 1957

Component	Expenditure (1)	Percentage (2)	Weight (3)
Books	\$121,216	30.05	.3005
Supplies and Equipment	186,258	46.17	.4617
Stenographers' Salaries	95,910	23.78	.2378

Source: ²Edmonton Public School Board, Annual Financial Report, 1957.

Plant Operation and Maintenance Subindex

The Plant Operation and Maintenance Subindex consisted of four components: caretakers' salaries, cleaning supplies, fuel and utilities, and repairs.

Component weights. An analysis of expenditure on components of the Plant Operation and Maintenance Subindex is set out in Table VI. The weight assigned to each component is set out in Column 3 of Table VI.

TABLE VI
BREAKDOWN OF PLANT OPERATION AND MAINTENANCE
EDMONTON PUBLIC SCHOOL BOARD 1957

Component	Expenditure (1)	Percentage (2)	Weight (3)
Caretakers' salaries	\$609,977	40.04	.4004
Cleaning supplies	37,572	2.47	.0247
Fuel and utilities	238,886	15.68	.1568
Repairs	636,824	41.81	.4181

Source: ¹Edmonton Public School Board, Annual Financial Report, 1957.

Since the proportion of expenditure devoted to the four components fluctuated very little during the period 1957-1967, use of the 1957 component weights to compile the Plant Operation and Maintenance Subindex was justified.

Transportation Subindex

Examination of the 1957 auditor's report revealed two major areas of expenditure in this category: transportation allowances and operation

of trucks. In 1960 a third input was introduced--pupil transportation. Since 1960 the importance of the pupil transportation component increased substantially.

Component weights. Due to variations in the percentage of total expenditure devoted to each component over the period 1957-1967, it became necessary to divide this component subindex into two parts. The first part was calculated using the base-year weights, and the second part was calculated using 1962 weights. The two parts were then spliced together and expressed as a single subindex with base 1957.

1962 was chosen as the splicing year for two reasons. First of all, 1962 was the median of the eleven-year period, and secondly, the 1962 weights were representative of the component distribution for the remaining years 1963-1967.

An analysis of expenditure on each component of the Transportation Subindex, for the years 1957 and 1962, is set out in Table VII.

TABLE VII

BREAKDOWN OF TRANSPORTATION EXPENDITURE OF THE
EDMONTON PUBLIC SCHOOL BOARD 1957, 1962

Component	Expenditure		Percentage	
	1957 (1)	1962 (2)	1957 (3)	1962 (4)
Pupil transportation	\$ -	\$62,555	-	42.61
Transportation allowances	97,347	47,480	84.22	32.34
Operation of trucks	18,233	36,782	15.78	25.05

Sources: ^{1,2}Edmonton Public School Board, Annual Financial Report, 1957, 1962.

On the basis of the analysis provided in Table VII, the component weights for each portion of the Transportation Subindex were as follows:

<u>Component</u>	<u>Weight (1957)</u>	<u>Weight (1962)</u>
Pupil transportation	-	.4261
Transportation Allowance	.8422	.3234
Operation of trucks	.1578	.2505

Other Expenditures Subindex

Although the inputs in this subindex were many and varied, it was possible to break down the inputs into four major components: taxes and local improvements, insurance, pensions, and miscellaneous expenditures.

Component weights. Since the relative importance of each component fluctuated from year to year, it became necessary to use the total expenditures for 1957, 1958, and 1959 to derive a weighting pattern that was representative of the expenditure pattern for the entire period 1957-1967.

The analysis of expenditure on each component, for the years 1957-1959, is set out in Table VIII. On the basis of this analysis, the weight of each component of the Other Expenditures Subindex is as follows: taxes and local improvements .3766, insurance .2434, pensions .2414, and miscellaneous .1386.

V. FINAL INDEX CONSTRUCTION

Each major subindex was compiled in accordance with the following steps.

Step I: Each component subindex was assigned a weight reflecting

its relative importance in the pattern of expenditures on each major category of input.

Step II: Price data were obtained for each component and expressed as price relatives for the years 1957-1967.

Step III: Each component price relative was multiplied by the component weight to provide a weighted price relative for each year.

Step IV: The weighted price relatives were summed for each year to provide major subindex values.

TABLE VIII

BREAKDOWN OF OTHER EXPENDITURES OF THE EDMONTON PUBLIC SCHOOL BOARD 1957, 1958, 1959

Component	Total Expenditure (1)	Percentage (2)	Weight (3)
Taxes and local improvements	\$339,689	37.66	.3766
Insurance	2.9,618	24.34	.2434
Pensions	2.7,830	24.14	.2414
Miscellaneous	124,949	13.86	.1386

Source: ²Edmonton Public School Board, Annual Financial Reports, 1957-1959.

To compile the final index the first, third, and fourth steps were repeated for each of the six major subindexes.

VI. COMPARISON OF PRICE INDEXES

The second and final stage of this study involved comparing the price relatives of the Alberta "Small Area" Education Price Indexes with

the price relatives of the Edmonton Education Price Index. This was to determine the extent to which the index values of the Alberta "Small Area" Education Price Indexes represented actual changes in the price level of educational inputs purchased by the Edmonton Public School Board.

A major problem was encountered when attempting to determine the most satisfactory method for comparing the two indexes. Due to the nature of the study parametric and non-parametric statistical methods were not appropriate. As a result, it was decided that the most suitable basis for comparing index numbers was by means of percentage figures which would represent the yearly increase in price relatives as well as the average increase in price relatives for the nine-year period, 1957-1965.

Utilization of the above method as the basis of comparison had two advantages. It made possible the observation and comparison of : (1) the year-to-year price level changes of educational inputs purchased by both the Edmonton Public School Board and all "small areas" authorities in Alberta; and (2) the general trend of price level increases in Edmonton and in "small areas" in Alberta for the period 1957-1965.

Because of the methodology employed in comparing the indexes, the comparisons were largely descriptive in nature. However, when interesting differences or similarities were observed in the index values, an analysis was made of the possible reasons for the similarities or differences.

VII. SUMMARY

This chapter has discussed in some detail the research design and the research procedures employed in this study. The major and component

subindexes have been identified and the weighting pattern of each has been discussed and justified. In additon, the method of comparing the Edmonton Education Price Index to the Alberta "Small Area" Education Price Indexes has been presented and justified.

REFERENCES FOR CHAPTER III

1. Atherton, P. J. "The Impact of Rising Price Levels on Expenditures for School Operation in Alberta 1957-1965." Unpublished Doctoral dissertation, University of Alberta, Edmonton, 1968.
2. Edmonton Public School Board. Annual Financial Report. The Edmonton School District No. 7, Alberta, 1957-1967.
3. Edmonton Public School Board. Current Budget. The Edmonton School District No. 7, Alberta, 1968.
4. Fisher, Irving. The Making of Index Numbers. Boston: Houghton Mifflin Company, 1923.

CHAPTER IV

THE EDMONTON EDUCATION PRICE INDEX

I. INTRODUCTION

This chapter reports the first stage of the study, the compilation of the Edmonton Education Price Index.

The first section of the chapter discusses the collection of price data and the details of construction of the component and major subindexes. The second section contains the details of construction of the final index.

II. THE MAJOR SUBINDEXES

Teachers' Services Subindex

The Teachers' Services Subindex was compiled from price data provided by the Department of Education, Government of Alberta. An average annual salary figure for teachers employed by the Edmonton Public School Board was computed for each year 1957-1967. The salary figures and the corresponding price relatives are set out in Columns 1 and 2 of Table IX.

Table IX shows that since 1957 teachers' salaries have increased substantially. During the eleven-year period the price level of teaching services increased by 77.29 per cent. For the most part, with the exception of 1967, the rate of yearly salary increase was continual and fairly uniform. However, in 1967, teachers' salaries experienced an increase of 15.25 per cent, a figure which greatly exceeds the mean yearly percentage increase of 5.48 per cent.

Further discussion of the price level increase of teachers' salaries is presented in Chapter V.

TABLE IX
DETAILS OF CONSTRUCTION OF TEACHERS'
SERVICES SUBINDEX

Year	Average Annual Salary (1)	Price Relative (2)
1957	\$4540	100.00
1958	4828	106.34
1959	5123	112.84
1960	5475	120.59
1961	5881	129.54
1962	6081	133.94
1963	6301	138.79
1964	6403	141.04
1965	6772	149.16
1966	6984	153.83
1967	8049	177.29

Source: Compiled from Form 1302-338 of the Department of Education, 1957-1967.

Administration Subindex

The Administration Subindex consisted of four component subindexes: officials' salaries, clerical salaries, communication items, and office supplies.

Price data. Mr. W. H. Boyce, Director of Accounting and Budget, Edmonton Public School Board, stated in a personal conversation that the officials' salary account consisted of salaries paid to the superintendent, assistant superintendents, associate superintendents, the secretary-treasurer, the deputy treasurer, and the deputy secretary. Consequently, the officials' salary component subindex was compiled from an unweighted average salary of these central office administrators. The required price data were obtained from the annual reports of the Department of Education and are set out in Column 1 of Table X. Column 2 of Table X contains the corresponding price relatives.

Since the Edmonton Public School Board was unable to provide an average annual salary figure for the central office clerical staff, a representative salary scale was selected from the Alberta Bureau of Statistics' Salary and Wage Rate Survey. The salary series selected as being representative of the salaries of the central office clerical staff was the series for "Senior Clerk, Female" employed in various institutions in Edmonton. The selection of this series is justified on the basis of a conversation with Mr. S. K. Turner, Director of Business Personnel, Edmonton Public School Board. He indicated that the clerical staff in the central office were required to make independent judgments, have a knowledge of rules and regulations, and have previous experience as school secretaries. This job description is very similar to the definition of "Senior Clerk's" duties, provided by the Alberta Bureau of

TABLE X
PRICE DATA AND PRICE RELATIVES FOR CENTRAL OFFICE
ADMINISTRATORS AND CLERICAL STAFF

	Officials' Salaries		Clerical Salaries	
	Average ¹ Salary (1)	Price Relative (2)	Monthly ² Salary (3)	Price Relative (4)
1957	\$10,880	100.00	\$254	100.00
1958	11,309	103.94	282	111.02
1959	12,247	112.56	294	115.75
1960	12,744	117.13	319	125.59
1961	12,986	119.36	318	125.20
1962	13,329	122.50	305	120.08
1963	13,599	124.99	306	120.47
1964	14,207	130.57	311	122.44
1965	14,906	137.00	321	126.38
1966	16,066	147.66	373	146.85
1967	18,416	169.26	378	148.82

Sources: ¹Government of Alberta, Department of Education, Annual Reports, 1957-1967.

²Alberta Bureau of Statistics, Salary and Wage Rate Survey, 1957-1967.

Statistics.

Performs difficult clerical work of a varied nature involving frequent exercise of independent judgment. Compiles and checks reports and tabulation, receives the public and handles inquiries, complaints and adjustments. Usually has some latitude of discretion in determining office methods and procedures, and in supervising a small group of clerical subordinates. Requires at least two years experience in clerical work. (1, p. 3)

The salary figures and the corresponding price relatives of the component subindex for clerical salaries are set out in Columns 3 and 4 of Table X.

The communication component subindex was compiled from price data concerning postage, telephone and telegraph rates. The weighting pattern was as follows: postage .25, telephone .70, and telegraph .05.

In the period 1957-1967 postage and telephone rates remained constant. Telegraph rates increased twice during this period; on October 17, 1960 and again in February of 1967.

To calculate the price relatives of the telegraph component, the price of a fifteen word telegram from Edmonton to five points in the United States was first determined. The price relatives were then calculated on the basis of the price changes.

The details of construction of the communication component subindex are provided in Appendix A. The price relatives developed in Appendix A are set out in Column 5 of Table XI.

The Edmonton Public School Board in its 1967 budget statement reported that the single item "paper" accounts for approximately seventy-five per cent of the expenditure charged to the office supplies account (4, p. A-3). As a result, it was felt that the price change of duplicating paper would be indicative of price changes for the entire component. It should be pointed out that the price of items contained in the remaining twenty-five per cent would have to increase dramatically

TABLE XI
DETAILS OF CONSTRUCTION OF ADMINISTRATIVE SUBINDEX

Officials' Salaries		Clerical Salaries		Communication Items		Office Supplies			
.2234		.6933		.0419		.0414			
Year	P. Rel. (1)	Wtd. P.R. (2)	P. Rel. (3)	Wtd. P.R. (4)	P. Rel. (5)	Wtd. P.R. (6)	P. Rel. (7)	Wtd. P.R. (8)	Subindex (9)
1957	100.00	22.34	100.00	69.33	100.00	4.19	100.00	4.14	100.00
1958	103.94	23.22	111.02	76.97	100.00	4.19	100.00	4.14	108.52
1959	112.56	25.15	115.75	80.25	100.00	4.19	133.90	5.54	115.13
1960	117.13	26.17	125.59	87.07	100.00	4.19	137.30	5.68	123.11
1961	119.36	26.66	125.20	86.80	101.33	4.24	137.30	5.68	123.38
1962	122.50	27.37	120.08	83.25	101.33	4.24	137.30	5.68	120.54
1963	124.99	27.92	120.47	83.52	101.33	4.24	137.30	5.68	121.36
1964	130.57	29.17	122.44	84.89	101.33	4.24	137.30	5.68	123.98
1965	137.00	30.61	126.38	87.61	101.33	4.24	137.30	5.68	128.14
1966	147.66	32.99	146.85	101.81	101.33	4.24	137.30	5.68	144.72
1967	169.26	37.91	148.82	103.18	102.73	4.30	137.30	5.68	150.97

Sources: ^{1,3}Table X, page 52.

⁵Table XXIX, Appendix A.

⁷Table XXXII, Appendix B.

to affect the overall price index, since office supplies constitute only 4.14 per cent of administrative expenses.

The price of 8½ by 11 duplicating paper (18 lb. weight) increased in 1959 from \$2.95 to \$3.95 per thousand, and again in 1960 from \$3.95 to \$4.05 per thousand.¹ From 1960 to 1967 the price remained constant.

The price relatives and weighted price relatives for the office supplies component subindex are set out in Columns 7 and 8 of Table XI.

Subindex construction. Table XI shows the details of construction of the Administration Subindex. The price relatives for each component were weighted in accordance with the weighting pattern described in Chapter III, and the weighted price relatives have been summed for each year, 1957-1967, to form the subindex values of Column 9.

Table XI indicates that during the eleven-year period the price level of administrative services increased by 50.97 per cent. Officials' salaries increased by 69.26 per cent, the salaries of the clerical staff by 48.82 per cent, the price of communication items by 2.73 per cent, and the price of office supplies increased 37.30 per cent.

As Table XI shows, officials' salaries increased most rapidly, particularly during the period 1963 to 1967. Clerical salaries remained relatively stable during the period 1960 to 1965, but experienced periods of rapid increase from 1958 to 1960, and again from 1965 to 1967.

Instructional Aids and Supplies Subindex

The Instructional Aids and Supplies Subindex consisted of three component subindexes: books, supplies and equipment, and school

¹Table XXXII, Appendix B.

stenographers' salaries.

Price data. Since the Edmonton Public School Board purchases the majority of its books from the School Book Branch of the Department of Education, price data for the book component were obtained from the School Book Branch.

The book index was developed by using the two "market baskets" of books that Atherton selected for his study. Justification for using Atherton's data was based on the fact that Mr. Fedorak, Assistant Manager of the School Book Branch, noted that Atherton's selection of text and library books was representative of school board purchases, and that the books represented a fair price change (2, pp. 106-107). Thus, all that was required was to extend Atherton's price data from 1965 to 1967.

Atherton's textbook "market basket" consisted of ten text and reference books which had been authorized for use in elementary, junior high and senior high levels as primary references. The supplementary reader "market basket" consisted of four library books selected from Department of Education lists of authorized supplementary reading (2, p. 106).

To compile the book index, the books in each market basket were priced for each year of the series and the total cost of each market basket was expressed in price relative form. The two "market baskets" were then combined into a single book index by using the following weighting pattern: textbooks .80, supplementary readers .20 (2, p. 106).

The "market baskets" and the details of construction of the component subindex for books are set out in Appendix B. The price relatives developed in Appendix B have been transferred to Column 1 of

Table XII.

Compilation of the supplies and equipment component of the Instructional Aids and Supplies Subindex presented a number of problems. Since a large number of goods were included in this component, and as it was extremely difficult to pick out specific commodities that were representative of an entire class, it was decided to make use of an analysis provided by F. Dean, Manager of Moyer Division, Vilas Industries. Moyer Division provided Atherton with a breakdown of the company's total sales into major categories of furniture, chalkboard, maps and globes, machines, and general supplies. Since Mr. Dean, in a personal conversation, indicated that this breakdown was also representative of purchases made by the Edmonton Public School Board, the price data Atherton collected was thus extended from 1965 to 1967.

The data supplied by Moyer Division and the details of construction of the component subindex for instructional aids and supplies are set out in Tables XXXI and XXXII of Appendix B.

As the tables in Appendix B show, to develop the supplies and equipment component subindex Atherton first determined the approximate percentage of total sales attributable to each major category. Two commodities that were representative of the various categories were then selected. The commodities were priced for each year of the series and the prices expressed as price relatives. Using the category percentages as weighting data, the price relatives were converted to weighted price relatives (2, p. 109). The weighted price relatives for each year were summed to form the component subindex set out in Column 3 of Table XII.

The component subindex for stenographers' salaries was constructed from an unweighted average of two salary series compiled by the Alberta

TABLE XII

DETAILS OF CONSTRUCTION OF INSTRUCTIONAL SUPPLIES SUBINDEX

Year	Books		Supplies & Equipment		School Sten's Salaries		Subindex (7)
	Price Rel. (1)	Wtd. P.R. (2)	Price Rel. (3)	Wtd. P.R. (4)	Price Rel. (5)	Wtd. P.R. (6)	
Weight	.3005		.4617		.2378		
1957	100.0	30.05	100.0	46.17	100.00	23.78	100.00
1958	103.1	30.98	100.0	46.17	107.96	25.67	102.82
1959	103.1	30.98	110.6	51.06	110.34	26.24	108.28
1960	107.3	32.24	111.6	51.52	112.73	26.81	110.57
1961	110.1	33.08	112.1	51.76	119.89	28.51	113.35
1962	114.1	34.29	112.8	52.08	117.77	28.00	114.37
1963	118.3	35.55	113.2	52.26	120.16	28.57	116.38
1964	119.8	36.00	118.4	54.66	124.93	29.71	120.37
1965	121.6	36.54	118.5	54.71	131.03	31.16	122.41
1966	127.9	38.43	120.3	55.54	137.14	32.61	126.58
1967	123.9	37.23	129.4	59.74	151.19	35.95	132.92

Sources: ¹Table XXX, Appendix B.³Table XXXII, Appendix B.⁵Table XXXIII, Appendix B.

Bureau of Statistics. They were the "Clerk (Beginning Level)" and "Clerk-General, (Intermediate Level)," series for females employed in various institutions or organizations in Edmonton.

The selection of the two series was justified because of the degree of correspondence between the job descriptions for the two salary series and the actual duties of school stenographers. Mr. S. K. Turner, Director of Business Personnel, Edmonton Public School Board, in a personal conversation stated that the following job descriptions included almost all the clerical duties performed by school stenographers.

Clerk (Beginning Level)

Performs simple and elementary level clerical work of a routine nature, under close supervision sorts and distributes mail, addresses, stuffs and stamps envelopes. Keeps simple records, operates standard office equipment such as adding machines, cash registers, mimeograph and ditto machines. Makes simple arithmetic computations and performs other routine duties requiring a minimum of judgment. (1, p. 1)

Clerk-General (Intermediate Level)

Performs a variety of moderately complex clerical duties under general supervision which require a knowledge of office procedures and methods. Gathers source material for reports, maintains and balances various types of ledger accounts, posts records of moderate complexity, may explain policies and procedures to the public. May assign routine work to others in work-leader capacity, with limited responsibility for disciplinary supervision. (1, p. 2)

The price data and the details of construction of the school stenographer component of the Instructional Aids and Supplies Subindex are set out in Table XXXIII of Appendix B. The price relatives developed in Table XXXIII have been transferred to Column 5 of Table XII.

Subindex construction. Table XII shows the details of construction of the Instructional Aids and Supplies Subindex. The price relatives have been weighted in accordance with the weighting pattern established on page 41. The weighted price relatives have been summed for each

year in the series to result in the index values of Column 7.

Table XII shows that the price level of instructional aids and supplies increased by 32.92 per cent during the period 1957 to 1967. The school stenographer component increased by 51.19 per cent, but the influence of this component was not great since the weight was only .2378. Other inputs into instructional aids and supplies showed smaller increases. The book component increased by 23.9 per cent, and the supplies and equipment component by 29.4 per cent.

Plant Operation and Maintenance Subindex

The Plant Operation and Maintenance Subindex consisted of four components: caretakers' salaries, cleaning supplies, fuel and utilities, and repairs.

Price data. The wage data for the caretakers' salary component were derived from yearly salary agreements between the Caretakers' Union and the Edmonton Public School Board. The weights that were used to compile the component subindex for caretakers' salaries were derived from a percentage breakdown of salaries paid to the caretaking staff. In 1957 a total of 263 individuals were employed on the caretaking staff, broken down into the following categories: 85 senior caretakers, 57 junior caretakers, and 121 part-time female assistants (3, p. 16). The proportion of salary expenditure devoted to each group was as follows: senior caretakers 53.02 per cent, junior caretakers 29.25 per cent, and female assistants 17.73 per cent.

The salary data for the caretakers' salary component together with the price relatives and weighted price relatives developed from them are set out in Table XIII. The weighted price relatives have been

TABLE XIII

DETAILS OF CONSTRUCTION OF CARETAKERS' SALARY COMPONENT
OF THE PLANT OPERATION AND MAINTENANCE SUBINDEX

Year	Female Assistants				Junior Caretakers				Senior Caretakers			
	Hourly Wage (1)	Price Rel. (2)	Wtd. P.R. (3)	Annual Salary (4)	Price Rel. (5)	Wtd. P.R. (6)	Annual Salary (7)	Price Rel. (8)	Wtd. P.R. (9)	Component Subindex (10)		
Weight	.1773				.2925				.5302			
1957	\$.90	100.00	17.73	\$2900	100.00	29.25	\$3525	100.00	53.02	100.00		
1958	.90	100.00	17.73	2900	100.00	29.25	3525	100.00	53.02	100.00		
1959	.97	107.78	19.11	3110	107.24	31.38	3790	107.52	57.01	107.50		
1960	1.00	111.11	19.70	3397	117.14	34.26	3818	108.31	57.43	111.39		
1961	1.05	116.67	20.68	3397	117.14	34.26	3818	108.31	57.43	112.37		
1962	1.075	119.44	21.18	3800	131.03	38.33	4200	119.15	63.17	122.68		
1963	1.10	122.22	21.70	3800	131.03	38.33	4300	121.96	64.66	124.69		
1964	1.135	126.11	22.36	3850	132.76	38.83	4380	124.26	65.88	127.07		
1965	1.175	130.55	23.17	3935	135.69	39.70	4500	127.66	67.68	130.55		
1966	1.215	135.00	23.94	4035	139.18	40.71	4650	131.91	69.94	134.59		
1967	1.35	150.00	26.60	4525	156.03	45.64	5140	145.82	77.31	149.55		

Sources: 1,4,7 Computed from Caretakers' Salary Agreements, 1957-1967.

summed to result in the index values of Column 10.

Due to the difficulties encountered when attempting to obtain price data on representative items for the caretakers' supplies component, it was decided that the most appropriate source of price data would be a published index series. The series selected as being representative of the price movements of caretakers' supplies was the Industry Selling Price Index of the "Soaps, washing compounds and cleaning preparations Industry" compiled by the Dominion Bureau of Statistics, Prices Division. This selection was justified on the basis of a letter received from Mid-West Supplies. (The Edmonton Public School Board, in the past, has purchased a great share of its caretaking supplies from Mid-West Supplies.) L. Hudson, Office Manager of Mid-West Supplies, pointed out that, as far as their office was able to discern, the price relatives of the index for "Soaps, washing compounds and cleaning preparations" were indicative of price level changes of caretakers' supplies (Appendix C).

Since the Industry Selling Price Indexes have a base year of 1956, it was necessary to shift the base to 1957 by dividing each index value in the series by the 1957 value. The price relatives with base 1957 are set out in Column 3 of Table XV.

Construction of the fuel and utilities component of the Plant Operation and Maintenance Subindex necessitated obtaining price data on four commodities: fuel, telephone, power, and water. For the most part, the price levels of these commodities remained relatively stable during the index period. W. J. Prausa, Supervisor of Commercial Section, Northwestern Utilities, in a telephone conversation noted that, aside from an increase in rates in late 1959, the price of natural gas remained unchanged for the entire eleven-year period. (In 1959 the rate structure

changed from 1.9 cents per therm to 2.3 cents per therm.) Telephone rates during the period under study remained constant. According to B. Adair², Assistant Superintendent of Consumer Service, Water Department, City of Edmonton, water rates increased only once during the period, in December of 1961. Although power rates changed three times during the eleven years, the only significant change occurred in April of 1960.

Price data for the water and power components of the fuel and utilities subindex are set out in Appendix C. The price relatives developed in Appendix C have been transferred to Columns 5 and 7 of Table XIV.

The details of construction of the component subindex for fuel and utilities are shown in Table XIV. Using the 1957 school board expenditure pattern for fuel and utilities as weighting data, the price relatives have been converted to weighted price relatives. The weighted price relatives have been summed for each year of the series to form the index values in Column 9.

The component subindex for repairs consisted of two major types of input, labor and materials. Since numerous types of labor and materials are used in repairing and maintaining schools and school grounds, a composite construction index was compiled to represent the movement of prices in this component.

The price data used to construct the repairs component subindex were derived from two index series compiled by the Dominion Bureau of Statistics. They were the "Non-residential Building Materials Index" and the "Construction Wage Index." Mr. R. H. Bradley, Chief, Retail

²Telephone conversation with Mr. Adair.

TABLE XIV

DETAILS OF CONSTRUCTION OF FUEL AND UTILITIES COMPONENT
OF PLANT OPERATION SUBINDEX

Year	Fuel			Telephone			Water			Power		
	P. Rel. (1)	Wtd. (2)	P.R. (2)	P. Rel. (3)	Wtd. (4)	P.R. (4)	P. Rel. (5)	Wtd. (6)	P.R. (6)	P. Rel. (7)	Wtd. (8)	Subindex (9)
Weight		.4801			.0264			.1276			.3659	
1957	100.00	48.01		100.00	2.64		100.00	12.76		100.00	36.59	100.00
1958	100.00	48.01		100.00	2.64		100.00	12.76		100.00	36.59	100.00
1959	100.00	48.01		100.00	2.64		100.00	12.76		100.00	36.59	100.00
1960	121.05	58.11		100.00	2.64		100.00	12.76		70.69	25.86	99.37
1961	121.05	58.11		100.00	2.64		100.00	12.76		70.69	25.86	99.37
1962	121.05	58.11		100.00	2.64		102.35	13.06		70.69	25.86	99.67
1963	121.05	58.11		100.00	2.64		102.35	13.06		70.69	25.86	99.67
1964	121.05	58.11		100.00	2.64		102.35	13.06		70.69	25.86	99.67
1965	121.05	58.11		100.00	2.64		102.35	13.06		70.69	25.86	99.67
1966	121.05	58.11		100.00	2.64		102.35	13.06		70.69	25.86	99.67
1967	121.05	58.11		100.00	2.64		102.35	13.06		70.85	25.92	99.73

Sources: ⁵Appendix C.⁷Table XXXIV, Appendix C.

Prices Section, Prices Division, notes that the price relatives of these indexes, although compiled on a national basis, are indicative of the price level changes of construction inputs as they occurred in Edmonton (Appendix E). Since the base year for these series is 1949, the bases were shifted to 1957 by dividing each price relative in the series by the 1957 index value. The price relatives were then combined into a single index by using the following weights which were derived from a breakdown of 1958 and 1959 school board expenditure on school repair and maintenance: labor .3834, materials .6166.

The details of construction of the component subindex for repairs are set out in Table XXXV of Appendix C. The price relatives developed in Appendix C have been transferred to Column 7 of Table XV.

Subindex construction. The details of construction of the Plant Operation and Maintenance Subindex are shown in Table XV. The price relatives for the various components have been weighted in accordance with the weighting pattern set out in Table VI, page 42, and summed to form the index values of Column 9.

Table XV shows that the price level of inputs into plant operation and maintenance increased by 36.38 per cent over the period 1957-1967. Caretakers' salaries increased by 49.55 per cent, caretakers' supplies increased by 12.40 per cent, repairs increased by 38.92 per cent, and fuel and utilities decreased by .07 per cent.

Transportation Subindex

Compilation of the Transportation Subindex necessitated obtaining price data for three components: truck operation, transportation allowances, and pupil transportation.

TABLE XV

DETAILS OF CONSTRUCTION OF PLANT OPERATION AND MAINTENANCE SUBINDEX

Year	Caretakers' Wages		Caretakers' Supplies		Fuel and Utilities		Repairs		Subindex (9)
	P. Rel. (1)	Wtd. P.R. (2)	P. Rel. (3)	Wtd. P.R. (4)	P. Rel. (5)	Wtd. P.R. (6)	P. Rel. (7)	Wtd. P.R. (8)	
Weight	.4004		.0247		.1568		.4181		
1957	100.00	40.04	100.00	2.47	100.00	15.68	100.00	41.81	100.00
1958	100.00	40.04	104.30	2.58	100.00	15.68	102.39	42.81	101.11
1959	107.50	43.04	108.50	2.68	100.00	15.68	105.63	44.16	105.56
1960	111.39	44.60	110.40	2.73	99.37	15.58	108.44	45.34	108.25
1961	112.37	44.99	110.70	2.73	99.37	15.58	109.15	45.64	108.94
1962	122.68	49.12	110.60	2.73	99.67	15.63	111.92	46.79	114.27
1963	124.69	49.92	110.90	2.74	99.67	15.63	114.55	47.89	116.18
1964	127.07	50.88	111.90	2.76	99.67	15.63	119.05	49.77	119.04
1965	130.55	52.27	114.40	2.83	99.67	15.63	125.05	52.28	123.01
1966	134.59	53.89	110.10	2.72	99.67	15.63	131.46	54.96	127.20
1967	149.55	59.88	112.40	2.78	99.73	15.64	138.92	58.08	136.38

Sources: ¹Column 10, Table XIII, page 61.³Computed from D.B.S., Industry Selling Price Indexes, "Soaps, Washing Compounds and Cleaning Preparations Industry," 1957-1965.⁵Column 9, Table XIV, page 64.⁷Table XXXV, Appendix C.

Price data. Price data required for the compilation of the truck operation component was of two major types: data for drivers' wages and data for the cost of operating trucks. J. T. Brown, Director of Maintenance and Operation, Edmonton Public School Board, stated in a personal conversation that approximately fifty per cent of truck operation expenditure was devoted to drivers' salaries, and that the items of depreciation, gasoline, and repairs accounted for approximately equal proportions of the remaining fifty per cent. The weights of the components included in the truck operation subindex were derived from this breakdown.

Price data required for the compilation of the truck operation component subindex were obtained from a variety of sources. Jack Adams, Chief Investigating Officer, Labor Relations Board, provided price data concerning wage rates of truck drivers. The hourly wage rate for light truck drivers employed by various firms in Edmonton, for each year of the series, is set out in Column 1 of Table XVI. The corresponding price relatives are set out in Column 2.

Price data for gasoline were obtained from Imperial Oil Limited and are set out in Column 3 of Table XVI. The prices quoted are net averages per gallon including provincial road tax but after discount. Column 4 of Table XVI contains the corresponding price relatives for each year of the series.

Price data for the depreciation component were based on the cost of a new one ton Ford (model--Express) truck. The price information was supplied by W. O. Anderson, Truck and Fleet Manager, Healy Motors, Edmonton. The price of the one ton Ford truck was obtained for the years 1957 and 1967. The two prices were then converted to annual rates

TABLE XVI

PRICE DATA AND PRICE RELATIVES FOR COMPONENTS OF TRUCK OPERATION INDEX

Drivers' Wages			Gasoline		Depreciation		Repairs - Edmonton Component					
Year	Wage Rate (1)	Price Rel. (2)	Price Data (3)	Price Rel. (4)	Price Data (5)	Price Rel. (6)	Tires (7)	Chass. Lub. (8)	Fender Repl. (9)	Muffler Repl. (10)	Brake Relin. (11)	Average Col. 7-11 (12)
1957	\$1.10	100.00	\$.281	100.00	\$2163	100.00	100.0	100.0	100.0	100.0	100.0	100.0
1958	1.25	113.63	.276	98.22	2246	103.84	99.7	101.4	109.5	105.5	101.5	103.5
1959	1.40	127.27	.268	95.37	2329	107.67	101.7	101.4	113.5	109.2	104.9	106.1
1960	1.45	131.81	.268	95.37	2412	111.51	107.8	101.4	118.0	111.4	104.8	108.7
1961	1.50	136.36	.268	95.37	2495	115.35	113.5	101.4	118.1	112.1	104.4	109.9
1962	1.50	136.36	.268	95.37	2578	119.19	107.8	100.0	120.1	109.3	107.4	108.9
1963	1.55	140.09	.290	103.20	2661	123.02	111.5	97.3	125.4	100.1	104.5	107.8
1964	1.60	145.45	.293	104.27	2744	126.86	113.9	98.4	128.4	98.4	104.6	108.7
1965	1.65	150.00	.288	102.49	2826	130.65	119.6	98.4	136.4	100.8	107.9	112.6
1966	1.70	154.54	.288	102.49	2908	134.44	126.3	99.2	143.0	106.6	111.8	117.4
1967	1.80	163.63	.290	103.20	2990	138.23	134.5	106.3	153.1	115.9	119.6	125.9

Sources: ¹Labor Relations Board, City of Edmonton.³Imperial Oil Limited, Edmonton.⁵Healy Motors, Edmonton.

7-11 Appendix E.

of increase by prorating the difference between the 1957 and 1967 prices. The price data and the corresponding price relatives for the depreciation component are set out in Columns 5 and 6 of Table XVI.

Price data for the repairs component were derived from the Edmonton automobile operation component of the Consumer Price Index. The information was supplied by the Dominion Bureau of Statistics (Appendix E).

The price relatives for the repairs component were based upon the unweighted average of five common repair items: tires, chassis lubrication, fender replacement, brake relining, and muffler replacement. The index values for the repairs component are set out in Column 12 of Table XVI.

Table XVII contains the details of construction of the truck operation component of the Transportation Subindex. The price relatives for the repairs, depreciation, and gasoline components have been averaged and set out in Column 4 of Table XVII. The price relatives in Column 4 have been averaged with the price relatives of the drivers' wage component to result in the index values of Column 6.

Transportation allowances are defined by the Edmonton Public School Board as a monthly allowance paid to tradesmen and central office officials who require the use of their own automobiles for board business. Mr. T. McDonald³, Supervisor of Accounts Payable, Edmonton Public School Board, stated that during the period 1957 to 1967 there was no fluctuation in car allowance rates. The only change that occurred during the period was that the number of school board employees receiving car allowances increased substantially. Consequently, the index values of the trans-

³Telephone conversation with Mr. McDonald.

TABLE XVII

DETAILS OF CONSTRUCTION OF TRUCK OPERATION COMPONENT
OF TRANSPORTATION SUBINDEX

Year	Repairs P. Rel. (1)	Depreciation P. Rel. (2)	Gasoline P. Rel. (3)	Average of P.R. Col. 1, 2, & 3 (4)	Drivers' Wages P. Rel. (5)	Com. Subindex Mean Col. 4 & 5 (6)
1957	100.0	100.00	100.00	100.00	100.00	100.00
1958	103.5	103.84	98.22	101.85	113.63	107.74
1959	106.1	107.67	95.37	103.04	127.27	115.15
1960	108.7	111.67	95.37	105.19	131.81	118.50
1961	109.9	115.35	95.37	106.87	136.36	121.62
1962	108.9	119.19	95.37	107.82	136.36	122.09
1963	107.8	123.02	103.20	111.34	140.90	126.12
1964	108.7	126.86	104.27	113.27	145.45	129.36
1965	112.6	130.65	102.49	115.24	150.00	132.62
1966	117.4	134.44	102.49	118.11	154.54	136.32
1967	125.9	138.23	103.20	122.44	163.63	143.04

Source: Table XVI, page 68.

portation allowance component were held at a constant 100.00.

Price data required for the compilation of the pupil transportation component were of two types: data on yellow bus lease rates and data on the price of student tickets and passes.

According to Mr. W. Robertson⁴, Director of Operations, Edmonton Transit System, the Edmonton Public School Board commenced to rent buses from the City of Edmonton on September 1, 1960. At that time the rental fee for a bus with a capacity of sixty was twenty-five dollars per bus per day. This rate remained in effect until 1967 when the fee was increased to twenty-eight dollars and fifty cents per bus per day.

In the past the policy of the Edmonton Public School Board has been to purchase student bus tickets from the City of Edmonton, and distribute them to students living more than one-half mile from school. During the period 1962-1966 the price of student tickets remained at four tickets for twenty-five cents. In 1967 the price doubled, two tickets for twenty-five cents.

Price data for the two commodities--bus rentals and student bus tickets--of the pupil transportation component were converted to price relatives. The price relatives were combined into a single index by using the following weights which were computed from school board expenditure data obtained from the 1957 budget statement: bus rental .6736, student tickets .3264.

The price relatives of the pupil transportation component are set out in Column 1 of Table XVIII.

⁴Telephone conversation with Mr. Robertson.

TABLE XVIII

DETAILS OF CONSTRUCTION OF TRANSPORTATION SUBINDEX

Year	Pupil Transportation			Transportation Allowance			Operation of Trucks			Sub-index (10)	Spliced Subindex (11)
	Price Rel. (1)	Wt. (2)	Wtd. P.R. (3)	Price Rel. (4)	Wt. (5)	Wtd. P.R. (6)	Price Rel. (7)	Wt. (8)	Wtd. P.R. (9)		
1957		.0000		100.00	.8422	84.22	100.00	.1578	15.78	100.00	100.00
1958				100.00		84.22	107.74		17.00	101.22	101.22
1959				100.00		84.22	115.15		18.17	102.39	102.39
1960				100.00		84.22	118.50		18.70	102.92	102.92
1961				100.00		84.22	121.62		19.19	103.41	103.41
1962				100.00		84.22	122.09		19.26	$\frac{103.48^x}{100.00^x}$	
	100.00	.4261	42.61	100.00	.3234	32.34	100.00	.2505	25.05	<u>100.00</u>	103.48
1963	100.00		42.61	100.00		32.34	103.30		25.87	100.82	104.32
1964	100.00		42.61	100.00		32.34	105.95		26.54	101.49	105.02
1965	100.00		42.61	100.00		32.34	108.62		27.21	102.16	105.72
1966	100.00		42.61	100.00		32.34	111.65		27.97	102.92	106.50
1967	142.05		60.54	100.00		32.34	117.15		29.35	122.23	126.48
$^x \text{Splicing Ratio} = \frac{\text{Subindex Value (Base 1957)}}{\text{Subindex Value (Base 1962)}}$											

Source: ⁷Computed from Table XVII, page 70.

Subindex construction. The details of construction of the Transportation Subindex are set out in Table XVIII. For the period 1957-1962, the price relatives for the three component subindexes were weighted by the base-year weights. The weighted price relatives of Column 6 and 9 were summed for each year to provide the index values of Column 10. Using the same method, but the 1962 weighting pattern, a second set of index values for 1962-1967 were computed. These index values are also set out in Column 10 of Table XVIII.

The two sets of subindex values set out in Column 10 of Table XVIII were spliced by multiplying each value for the years 1962-1967 by 1.0348. (1.0348 is the ratio of the 1962 values.)

The price relatives for the spliced series, covering the period 1957-1967, are set out in Column 11 of Table XVIII.

Table XVIII shows that the overall price level of transportation inputs increased by 26.48 per cent during the eleven-year period. The greatest part of this increase was concentrated in the last year of the series and was largely due to the 42.05 per cent increase in the price level of pupil transportation inputs.

Other Expenditures Subindex

Four major inputs were included in the Other Expenditures Subindex: taxes and local improvements, insurance, pensions, and miscellaneous expenditures.

Price data. Mr. W. Boyce⁵, Director of Budget and Accounting, Edmonton Public School Board, pointed out that the taxes and local improvement account consists of charges made by the City of Edmonton for

⁵Personal conversation with Mr. Boyce.

construction of such items as sidewalks, curbing, sewer lines, street paving, and other improvements on school grounds. Since the charges for construction of "local improvement items" include both labor and materials, the decision was made to use the composite construction index which was previously compiled for the repairs component of the Plant Operation and Maintenance Subindex. Thus, the index values of the composite construction index, which were developed in Table XXXV of Appendix C, have been transferred directly to Column 1 of Table XIX.

Discussions with various individuals employed by both the Edmonton Public School Board and a number of insurance companies pointed out that insurance rates remained quite stable during the eleven-year period. Mr. W. Boyce's report of fire insurance rates indicated that the amount of fluctuation in fire insurance rates during the eleven-year period was negligible (Appendix D). In addition, the school board's share of medical (fifty cents per contract) and hospitalization (ten cents per contract) premiums for permanent employees remained constant. The rate of contribution by the Edmonton Public School Board to the unemployment insurance fund for non-teacher personnel also remained quite stable, inasmuch as the rate of employer contribution increased only once during the eleven-year period. Due to the fact that the increase was relatively small and that the weight of the unemployment insurance component was only .18, the impact of the price increase upon the entire insurance component was slight, if not negligible. As a result, price relatives for the insurance component were included at a constant value of 100, and are set out in Column 3 of Table XIX.

The pension component consisted of expenditure made by the Edmonton Public School Board for non-teachers' pensions. Throughout the period, 1957-1967, the school board contributed five per cent of

TABLE XIX

DETAILS OF CONSTRUCTION OF OTHER EXPENDITURES SUBINDEX

Taxes & Local Improvement		Insurance		Pensions		Miscellaneous Expenditures			
.3766		.2434		.2414		.1386			
Weight									
Year	P. Rel. (1)	Wtd. P.R. (2)	P. Rel. (3)	Wtd. P.R. (4)	P. Rel. (5)	Wtd. P.R. (6)	P. Rel. (7)	Wtd. P.R. (8)	Subindex (9)
1957	100.00	37.66	100.00	24.34	100.00	24.14	100.0	13.86	100.00
1958	102.39	38.56	100.00	24.34	104.08	25.12	100.2	13.89	101.91
1959	105.63	39.78	100.00	24.34	109.79	26.50	101.6	14.08	104.70
1960	108.44	40.84	100.00	24.34	114.28	27.59	101.8	14.11	106.88
1961	109.15	41.10	100.00	24.34	115.51	27.88	102.8	14.25	107.57
1962	111.92	42.15	100.00	24.34	122.44	29.56	104.7	14.51	110.56
1963	114.55	43.14	100.00	24.34	124.48	30.05	106.8	14.80	112.33
1964	119.05	44.83	100.00	24.34	126.53	30.54	107.8	14.94	114.65
1965	125.05	47.09	100.00	24.34	129.80	31.33	109.8	15.22	117.98
1966	131.46	49.51	100.00	24.34	137.95	33.30	112.9	15.65	122.80
1967	138.92	52.32	100.00	24.34	149.79	36.16	115.2	15.97	128.79

Sources: ¹Table XXXV, Appendix C.⁷Computed from D.B.S., Wholesale Price Index, "Fully and Chiefly Manufactured Goods,"

1957-1967.

non-teachers' gross salaries to a pension plan for these employees. Consequently, price relatives for the pension component were derived from an unweighted average salary figure for all non-teaching personnel--the caretaking staff and the clerical staff--for each year of the series. The price relatives derived from the price data are set out in Column 5 of Table XIX.

The miscellaneous component of the Other Expenditures Subindex included a wide variety of inputs. As a result, it was decided that the price relatives of the Dominion Bureau of Statistics' Wholesale Price Index for "Fully and Chiefly Manufactured Goods" would be representative of price changes for inputs included in this category. The price relatives for this index are set out in Appendix E.

Since the base years for the Wholesale Price Indexes are 1935-1939, it was necessary to shift the base to 1957. The transformed price relatives, base 1957, are set out in Column 7 of Table XIX.

Subindex construction. Table XIX shows the details of construction of the Other Expenditures Subindex. The price relatives of each component have been weighted in accordance with the weighting pattern established in Table VIII on page 45. The weighted price relatives have been summed to form the index values of Column 9.

Table XIX shows that the price level of inputs in the Other Expenditures Subindex have increased by 28.79 per cent during the period 1957-1967. The taxes and local improvement component increased by 38.92 per cent, the cost of pensions by 49.79 per cent, and the cost of miscellaneous inputs by 15.2 per cent. The stability of price levels for the insurance component was a major factor in keeping the overall price level increase down to 28.79 per cent.

III. THE FINAL INDEX

The method used to compile the overall index was identical to that used in compiling the major subindexes.

Final Index Construction

Details of construction of the overall index are set out in Table XX. The price relatives of the six major subindexes have been weighted in accordance with the weighting pattern set out on page 43 of Chapter III. The weighted price relatives have been summed for each year of the series to provide the final index values of Column 13.

Table XX shows the price level of educational goods purchased by the Edmonton Public School Board increased by 64.77 per cent during the eleven-year period. Teachers' services, which accounted for 69.45 per cent of the price level increase, increased by 77.29 per cent. Other educational inputs showed a smaller price level increase. Administrative price levels increased by 50.97 per cent, the cost of instructional aids and supplies increased by 32.96 per cent, the cost of operating and maintaining a school plant increased 36.38 per cent, transportation increased by 26.48 per cent, and the price level of other educational inputs increased by 28.79 per cent.

Comments on the Final Index

As Table XX indicates, over the eleven-year period, the rate and the amount of price level increase of teacher inputs greatly exceeded that of non-teacher inputs. In addition, Table XX shows that with the exception of 1967 the annual price level increases were fairly uniform for the entire period.

A more extensive discussion on the Edmonton Education Price Index

TABLE XX

DETAILS OF CONSTRUCTION OF THE EDMONTON EDUCATION PRICE INDEX

Year	Teachers' Services			Adminis- tration			Instructional Aids & Suppl.			Plant Operation			Transpor- tation			Other Inputs			
	Price Rel. (1)	Wtd. P.R. (2)	Price Rel. (3)	Price Rel. (4)	Wtd. P.R. (5)	Price Rel. (6)	Price Rel. (7)	Wtd. P.R. (8)	Price Rel. (9)	Wtd. P.R. (10)	Price Rel. (11)	Wtd. P.R. (12)	Price Rel. (13)	Wtd. P.R. (14)	Price Rel. (15)	Wtd. P.R. (16)	Price Rel. (17)	Wtd. P.R. (18)	
Weight	.6945		.0305		.0524		.1875		.0043		.0308								
1957	100.00	69.45	100.00	3.05	100.00	5.24	100.00	18.75	100.00	.43	100.00	3.08	100.00	3.08	100.00	3.08	100.00	3.08	100.00
1958	106.34	73.85	108.52	3.31	102.82	5.39	101.11	18.96	101.22	.44	101.91	3.14	101.22	.44	101.91	3.14	101.22	.44	101.91
1959	112.84	78.37	115.13	3.51	108.28	5.67	105.56	19.79	102.39	.44	104.70	3.22	102.39	.44	104.70	3.22	102.39	.44	104.70
1960	120.59	83.75	123.11	3.75	110.57	5.79	108.25	20.30	102.92	.44	106.88	3.29	102.92	.44	106.88	3.29	102.92	.44	106.88
1961	129.54	89.96	123.38	3.76	113.35	5.94	108.94	20.43	103.41	.44	107.57	3.31	103.41	.44	107.57	3.31	103.41	.44	107.57
1962	133.94	93.02	120.54	3.68	114.37	5.99	114.27	21.43	103.48	.44	110.56	3.40	103.48	.44	110.56	3.40	103.48	.44	110.56
1963	138.79	96.39	121.36	3.70	116.38	6.10	116.18	21.78	104.32	.45	112.33	3.46	104.32	.45	112.33	3.46	104.32	.45	112.33
1964	141.07	97.95	123.98	3.78	120.37	6.31	119.04	22.32	105.02	.45	114.65	3.53	105.02	.45	114.65	3.53	105.02	.45	114.65
1965	149.16	103.59	128.14	3.91	122.41	6.41	123.01	23.06	105.72	.45	117.98	3.63	105.72	.45	117.98	3.63	105.72	.45	117.98
1966	153.83	106.83	144.72	4.41	126.58	6.63	127.20	23.85	106.50	.46	122.80	3.78	106.50	.46	122.80	3.78	106.50	.46	122.80
1967	177.29	123.13	150.97	4.60	132.92	6.96	136.38	25.57	126.48	.54	128.79	3.97	126.48	.54	128.79	3.97	126.48	.54	128.79

is presented in the following chapter, at which time a detailed analysis of year-to-year price level changes will be presented. In addition, Chapter V compares the index values of the Edmonton Education Price Index to the index values of the Alberta "Small Area" Education Price Index.

REFERENCES FOR CHAPTER IV

1. Alberta Bureau of Statistics. Salary and Wage Rate, Alberta.
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2. Atherton, P. J. "The Impact of Rising Price Levels on Expenditures
for School Operation in Alberta 1957-1965." Unpublished Doctoral
dissertation, University of Alberta, Edmonton, 1968.
3. Edmonton Public School Board. Annual Financial Report. The Edmonton
School District No. 7, Alberta, 1957.
4. Edmonton Public School Board. Current Budget. The Edmonton School
District No. 7, Alberta, 1967.

CHAPTER V

COMPARISON OF PRICE INDEXES

I. INTRODUCTION

The second stage of the study consisted of an examination of the degree to which changes in the price relatives of the Alberta "Small Area" Education Price Indexes represented the changes that occurred in the price level of educational inputs purchased by the Edmonton Public School Board during the period 1957-1965.

The examination was conducted so that the following comparisons could be made:

1. A comparison between the price relatives of the six major subindexes of the Alberta "Small Area" Education Price Index and the Edmonton Education Price Index.

2. A comparison between the price relatives of the final indexes of the Alberta "Small Area" Education Price Index and the Edmonton Education Price Index.

The corresponding indexes and subindexes were compared on the basis of a percentage figure, which represented the average annual percentage increase in the price level of educational inputs, for the period 1957-1965.

II. THE MAJOR SUBINDEXES

The Teachers' Services Subindexes

The Alberta "Small Area" Education Price Indexes (hereafter referred to as the Alberta Indexes) contained three salary subindexes. Compilation of Salary Subindex I was based on the assumption that years

of training are not a utility-determining characteristic in the quality of teachers' services. Thus, Atherton, in compiling Salary Subindex I, regarded any increase in the average salary paid to teachers as an increase in price level (1, p. 71).

Salary Subindexes II and III were based on an alternate assumption; that years of training are a utility-determining characteristic in the quality of teachers' services. Salary Subindex II was compiled on the basis that there were two levels of utility; teachers with three or more years of training and possessing the Professional Certificate, and teachers with less than three years of training and possessing certification lower than the Professional (1, p. 71).

Salary Subindex III was compiled on the basis that there were three levels of utility. The first level was represented by teachers with three or more years of training and possessing the Professional Certificate. The second level was represented by teachers with two years of training and possessing the Standard Certificate, and the third level represented those teachers with less than two years of training and possessing certification lower than the Standard (1, p. 71).

The relationships between the Salary Subindexes of the Alberta Index and the Teachers' Services Subindex of the Edmonton Index are set out in Table XXI. The price relatives for the three Salary Subindexes of the Alberta Index are set out in Columns 1, 2, and 3. Column 4 presents the price relatives for the Teachers' Services Subindex of the Edmonton Index. The corresponding annual percentage increases in price levels are set out in Columns 5, 6, 7, and 8.

Table XXI shows that the average annual price level increase for the Alberta Salary Subindexes was as follows: Salary Subindex I 6.10 per

TABLE XXI

DETAILS OF COMPARISON OF TEACHERS' SERVICES SUBINDEXES
ALBERTA AND EDMONTON EDUCATION PRICE INDEXES

Year	Price Relatives				Percentage Increase			
	I (1)	Alberta Indexes II (2)	III (3)	Edmonton Index (4)	I (5)	Alberta Indexes II (6)	III (7)	Edmonton Index (8)
1957	100.00	100.00	100.00	100.00				
1958	110.59	110.83	110.82	106.34	10.59	10.83	10.82	6.34
1959	121.14	121.78	121.81	112.84	9.54	9.88	9.91	6.87
1960	130.70	130.18	129.95	120.59	7.89	6.90	6.69	6.87
1961	140.58	139.00	138.53	129.54	7.56	6.78	6.60	7.42
1962	146.24	143.08	142.00	133.94	4.02	2.94	2.50	4.17
1963	149.88	145.41	144.87	138.79	2.49	1.63	2.02	3.62
1964	155.70	149.22	147.71	141.04	3.88	2.62	1.96	1.62
1965	160.06	151.31	150.09	149.16	2.80	1.40	1.61	5.76
			Mean Percentage Increase		<u>6.10</u>	<u>5.37</u>	<u>5.26</u>	<u>5.24</u>

Sources: 1,2,³Atherton, P. J. "The Impact of Rising Price Levels on Expenditures for School Operation in Alberta, 1957-1965." Unpublished Doctoral dissertation, University of Alberta, Edmonton, 1968, p. 92.

⁴Column 2, Table IX, page 50.

cent, Salary Subindex II 5.37 per cent, and Salary Subindex III 5.26 per cent. In addition, Column 8 of Table XXI shows that, for the period 1957-1965, the average annual increase in the salaries of Edmonton teachers was 5.24 per cent.

As the above percentage figures indicate, the Teachers' Services Subindex of the Edmonton Education Price Index is most closely related to the third Salary Subindex of the Alberta series. This result was not entirely unexpected. As pointed out in Chapter II, even though the Edmonton Salary Subindex was compiled from the average annual salary paid to teachers, allowances were made to consider the possibility that professional training may be a utility-determining characteristic in teachers' services. By citing research findings, it was determined that if in fact a relationship does exist between professional training and quality of teacher service, the relationship was not significant until teachers obtained five or more years of training. Thus, in this case, professional training determined two levels of teaching quality--teachers with four or less years of training represented one level and those with more than four years of training represented the second level. It will be recalled that an examination of the teaching staff of the Edmonton Public School System in terms of these two levels revealed that the percentage of teachers in each quality category fluctuated very little during the period 1957-1965. Consequently, as Wasserman points out, it was not necessary to differentiate between the two levels of teacher quality (2, p. 34).

Generally speaking, the rate of annual increase in teachers' salaries in "small areas" in Alberta declined steadily throughout the period 1957-1965. However, since this study was conducted at a lower

level of aggregation than Atherton's study, this trend was not apparent in the Edmonton Salary Subindex. Rather, in the Edmonton Public School System, teachers salaries experienced a larger than usual rate of increase each time a new salary agreement came into effect. In most every instance, higher than average rates of annual increase were associated with the introduction of a new one-year salary contract or the first year of a two-year agreement. On the other hand, the second year of a two-year salary agreement was characterized by a lower than average rate of salary increase.

The Administration Subindexes

Table XXII shows that for the nine-year period, 1957-1965, the average annual increase in the price level of administrative inputs, purchased by the Edmonton Public School Board, was 3.21 per cent. This percentage was higher than the average rate of price level increase (2.32 per cent per year) for administrative inputs purchased by small area authorities in Alberta. In order to determine the reasons for the differing rates of increase, it was necessary to examine the components of each index.

An examination revealed that each Administration Subindex consisted of the same components. However, it was found that the price relatives of the component subindexes for officials' salaries varied considerably. For example, the 1965 index value of Atherton's Officials' Salaries Index was 117.98. The corresponding index value for the Edmonton Index was 137.00. These differences in index values may have been due, in part, to the fact that the officials' salaries component of the Edmonton Index was compiled from actual data obtained from the Department of Education, whereas Atherton obtained his price data from the Alberta

TABLE XXII
DETAILS OF COMPARISON OF ADMINISTRATION SUBINDEXES
ALBERTA AND EDMONTON EDUCATION PRICE INDEXES

Year	Price Relatives		Percentage Increase	
	Alberta (1)	Edmonton (2)	Alberta (3)	Edmonton (4)
1957	100.00	100.00		
1958	102.66	108.52	2.66	8.52
1959	104.63	115.13	1.88	6.09
1960	108.99	123.11	4.16	6.93
1961	112.82	123.38	3.51	.22
1962	112.79	120.54	-.03	-2.30
1963	115.71	121.36	2.59	.68
1964	114.55	123.98	-1.00	2.16
1965	119.99	128.14	4.75	3.36
	Mean Percentage Increase		2.32	3.21

Sources: ¹Atherton, P. J. "The Impact of Rising Price Levels on Expenditures for School Operation in Alberta, 1957-1965." Unpublished Doctoral dissertation, University of Alberta, Edmonton, 1968, p. 99.

²Column 9, Table XI, page 54.

Bureau of Statistics series for "Non-Professional Accountant--Office Supervisors" employed in Alberta institutions (1, p. 98).

The clerical salaries components also differed, even though the price data for the two indexes were obtained from the same source. Atherton selected two published salary series and combined them into an unweighted average to represent the wage movements of clerical workers in Alberta school systems. They were the Alberta Bureau of Statistics series for "Clerk (Beginning Level), Female" and "Clerk (Intermediate Level), Female" employed in Alberta institutions (1, p. 98). The salary series selected as being representative of the salaries of the Edmonton Public School Board's central office clerical staff was the series for "Senior Clerk, Female," employed in various organizations in Edmonton.

The differences in the price relatives of the clerical salaries components were largely variations in the annual rates of salary increase, not differences in the overall amount of price level increase. Although this factor may have had a limited effect on the Administration Sub-indexes, it was responsible, in part, for the higher average rate of price level increase for administrative inputs in Edmonton.

The Instructional Aids and Supplies Subindexes

Table XXIII shows that the price level of instructional aids and supplies purchased by the Edmonton Public School Board increased 2.57 per cent per year for the period 1957-1965. The average rate of annual increase in price level for instructional supplies purchased by small area authorities in Alberta was 2.36 per cent.

It will be recalled that Atherton's "market baskets" of goods were used to compile the book index and the supplies and equipment index of the Edmonton series. Thus, the slight difference between price

TABLE XXIII

DETAILS OF COMPARISON OF INSTRUCTIONAL AIDS SUBINDEXES
ALBERTA AND EDMONTON EDUCATION PRICE INDEXES

Year	Price Relatives		Percentage Increase	
	Alberta (1)	Edmonton (2)	Alberta (3)	Edmonton (4)
1957	100.00	100.00		
1958	101.55	102.82	1.55	2.82
1959	108.00	108.28	6.53	5.31
1960	110.22	110.57	2.06	2.11
1961	111.53	113.35	1.19	2.51
1962	114.12	114.37	2.32	.90
1963	115.96	116.38	1.61	1.76
1964	119.73	120.37	3.25	3.43
1965	120.44	122.41	.59	1.69
	Mean Percentage Increase		2.36	2.57

Sources: ¹Atherton, P. J. "The Impact of Rising Price Levels on Expenditures for School Operation in KAlberta, 1957-1965." Unpublished Doctoral dissertation, University of Alberta, Edmonton, 1968, p. 108.

²Column 7, Table XII, page 58.

relatives of the Instructional Supplies Subindexes was due to differences in the index values of the third component of each subindex. The Alberta Index included "correspondence courses" as the third component of the Instructional Supplies Subindex, whereas the Edmonton Index included school stenographers' salaries as the third component.

For the period 1957-1965, the price level of correspondence courses increased by 77 per cent. However, due to the relative unimportance of this component (weight .0137), its effect upon the Alberta Instructional Supplies Subindex was negligible. On the other hand, in the Edmonton series, the weight given to the school stenographers' salaries component was .2378. As a result, the 31.03 per cent increase in the price level of stenographers' salaries was large enough to create the differences which exist between the index values of the two Instructional Supplies Subindexes.

The Plant Operation and Maintenance Subindexes

The Plant Operation and Maintenance Subindexes of both the Alberta and Edmonton Education Price Indexes consisted of four components: caretakers' wages, caretakers' supplies, fuel and utilities, and repairs.

Table XXIV shows that for the period 1957-1965 the average annual increase in the price level of plant operation inputs for Edmonton was 2.63 per cent. The average price level increase of the same inputs for small area authorities in Alberta was 2.65 per cent.

The small amount of difference in the average rate of price level increase was due to slight variations in the price relatives of two corresponding components--caretakers' wages, and repairs.

The Edmonton Education Price Index utilized actual price data to compile the caretakers' wages component. On the other hand, the price

TABLE XXIV

DETAILS OF COMPARISON OF PLANT OPERATION SUBINDEXES
ALBERTA AND EDMONTON EDUCATION PRICE INDEXES

Year	Price Relatives		Percentage Increase	
	Alberta (1)	Edmonton (2)	Alberta (3)	Edmonton (4)
1957	100.00	100.00		
1958	102.10	101.11	2.10	1.11
1959	103.96	105.56	1.82	4.40
1960	106.64	108.25	2.58	2.55
1961	107.38	108.94	1.12	.64
1962	107.58	114.27	-.23	4.89
1963	112.89	116.18	4.94	1.67
1964	117.20	119.04	3.82	2.46
1965	123.08	123.01	5.02	3.34
	Mean Percentage Increase		2.65	2.63

Sources: ¹Atherton, P. J. "The Impact of Rising Price Levels on Expenditures for School Operation in Alberta, 1957-1965." Unpublished Doctoral dissertation, University of Alberta, Edmonton, 1968, p. 118.

²Column 9, Table XV, page 66.

data for the Alberta Indexes were obtained from the Alberta Bureau of Statistics salary series for "Male Janitors" employed in institutions in Alberta (1, pp. 112-113). As a result of the differences in price data, the index values of the Edmonton component for caretakers' wages increased at a slightly faster rate than the price relatives of the Alberta Index.

The price data used to compile the repairs components for both the Edmonton and Alberta Indexes were derived from the Dominion Bureau of Statistics Non-residential Building Materials Index and the Dominion Bureau of Statistics Construction Wage Index. However, the price relatives of these two indexes were combined into a single index by using different weighting patterns. Atherton combined the two series by weighting the wage series by .60, and the materials index by .40; whereas the weighting pattern utilized in compiling the Edmonton index was labor .3834, materials .6166. As a result of the difference in the weighting patterns, the price relatives for the repairs component of the Alberta Index increased at a slightly faster rate than the price relatives of the Edmonton repairs component.

Thus, when the components were combined to form a single index, the index values of the Edmonton Plant Operation Subindex were very similar to the price relatives of the Alberta Plant Operation Subindex.

The Transportation Subindexes

The average rate of price level increase for transportation inputs in Edmonton was significantly lower than the average annual rate of increase for all "small areas" in Alberta. Table XXV shows that the average price level increase for transportation inputs in Edmonton was .70 per cent per year; for all small areas in Alberta the average annual increase was 2.77 per cent.

TABLE XXV

DETAILS OF COMPARISON OF TRANSPORTATION SUBINDEXES
ALBERTA AND EDMONTON EDUCATION PRICE INDEXES

Year	Price Relatives		Percentage Increase	
	Alberta (1)	Edmonton (2)	Alberta (3)	Edmonton (4)
1957	100.00	100.00		
1958	97.30	101.22	-2.70	1.22
1959	109.19	102.39	12.21	1.16
1960	114.64	102.92	4.99	.52
1961	115.72	103.41	.94	.48
1962	117.84	103.48	1.83	.07
1963	118.09	104.32	.21	.81
1964	123.10	105.02	4.24	.67
1965	123.60	105.72	.41	.67
	Mean Percentage Increase		2.77	.70

Sources: ¹Atherton, :. J. "The Impact of Rising Price Levels on Expenditures for School Operation in Alberta, 1957-1965." Unpublished Doctoral dissertation, University of Alberta, Edmonton, 1968, p. 126.

²Column 11, Table XVIII, page 70.

The large difference in the rate of price level increase was due to several factors. First of all, the price level of pupil transportation inputs for Edmonton remained stable for the nine-year period. This was due to the fact that the rental fee charged by the City of Edmonton for a school bus remained at twenty-five dollars per bus per day. Secondly, the index values of the transportation allowance component also remained constant at 100.00. In addition, because of the relative unimportance of the truck operation component, its effect upon the overall Transportation Subindex was limited even though the index values of the truck operation component increased fairly rapidly. Thus, for the period, 1957-1965, the price level of transportation inputs for Edmonton increased by only 5.72 per cent. This is significantly lower than the 23.6 per cent increase in the price level of transportation inputs purchased by small area authorities in Alberta.

The Other Expenditures Subindexes

The inputs included in these subindexes were many and varied. As a result, Atherton decided to use the Dominion Bureau of Statistics Wholesale Price Index for "Fully and Chiefly Manufactured Goods" to represent the price movements of goods included in this subindex (1, p. 127).

The Other Expenditures Subindex of the Edmonton Index was compiled on a different basis. It consisted of four components: taxes and local improvements, insurance, pensions, and miscellaneous expenditures. Each component, in turn, was composed of one or more commodities. As a result, when the price relatives of each component were combined into a single index, the final index values were somewhat different than the index values of the Alberta Index.

Table XXVI shows that the average rate of increase in the price level of educational inputs included in the Edmonton Other Expenditures Subindex was 2.09 per cent per year for the period 1957-1965. For the same period, the price level of other expenditure inputs, as purchased by small area authorities in Alberta, increased at the average annual rate of 1.18 per cent.

III. THE FINAL INDEXES

Table XXVII shows that there are substantial differences between the three Alberta Indexes and the Edmonton Index in both the annual rate of increase and in the index values.

Alberta Index I, which was compiled using Salary Subindex I, shows the highest average rate of increase with an increase of 5.12 per cent per year. In addition, the index indicates that in the period 1957-1965 the price level of educational inputs increased by 48.82 per cent.

The increase in the price level of educational inputs was not as great for Alberta Indexes II and III. It will be recalled that the Salary Subindexes for these two indexes were compiled on the assumption that there is a relationship between years of training and the quality of teaching service.

Alberta Index II, of which Salary Subindex II is a part, shows an average annual increase of 4.56 per cent and a total increase of 42.61 per cent for the nine-year period.

The third Alberta Index shows an average increase of 4.49 per cent per year and a total increase of 41.74 per cent for the nine-year period. The Salary Subindex included in this index was compiled on the assumption that there are three levels of utility in teaching services.

TABLE XXVI
DETAILS OF COMPARISON OF OTHER EXPENDITURES SUBINDEXES
ALBERTA AND EDMONTON EDUCATION PRICE INDEXES

Year	Price Relatives		Percentage Increase	
	Alberta (1)	Edmonton (2)	Alberta (3)	Edmonton (4)
1957	100.00	100.00		
1958	100.16	101.91	.16	1.91
1959	101.55	104.70	1.38	2.74
1960	101.80	106.88	.25	2.08
1961	102.87	107.57	1.05	.65
1962	104.66	110.56	1.74	2.78
1963	106.85	112.33	2.09	1.60
1964	107.78	114.65	.87	2.06
1965	109.83	117.98	1.90	2.90
	Mean Percentage Increase		<u>1.18</u>	<u>2.09</u>

Sources: ¹Atherton, P. J. "The Impact of Rising Price Levels on Expenditures for School Operation in Alberta, 1957-1965." Unpublished Doctoral dissertation, University of Alberta, Edmonton, 1968, p. 129.

²Column 9, Table XIX, page 75.

TABLE XXVII

DETAILS OF COMPARISON OF THE ALBERTA AND EDMONTON EDUCATION PRICE INDEXES

Year	Price Relatives			Percentage Increase		
	Alberta Indexes I (1)	II (2)	III (3)	Edmonton Index (4)	Alberta Indexes I (5) II (6) III (7)	Edmonton Index (8)
1957	100.00	100.00	100.00	100.00		
1958	108.00	108.18	108.18	105.09	8.00	5.09
1959	116.34	116.80	116.82	111.00	7.72	5.62
1960	123.91	123.54	123.38	117.32	6.51	5.69
1961	131.29	130.24	129.90	123.84	5.96	5.56
1962	135.52	133.27	132.76	127.96	3.22	3.33
1963	139.27	136.35	135.71	131.88	2.77	3.06
1964	144.41	139.71	137.74	134.34	3.69	1.87
1965	148.82	142.61	141.74	141.05	3.05	4.99
			Mean Percentage Increase		5.12	4.40
					4.56	4.49

Sources: ^{1,2,3}Atherton, P. J. "The Impact of Rising Price Levels on Expenditures for School Operation in Alberta, 1957-1965." Unpublished Doctoral dissertation, University of Alberta, Edmonton, 1968, p. 135.

⁴ Column 13, Table XX, page 78.

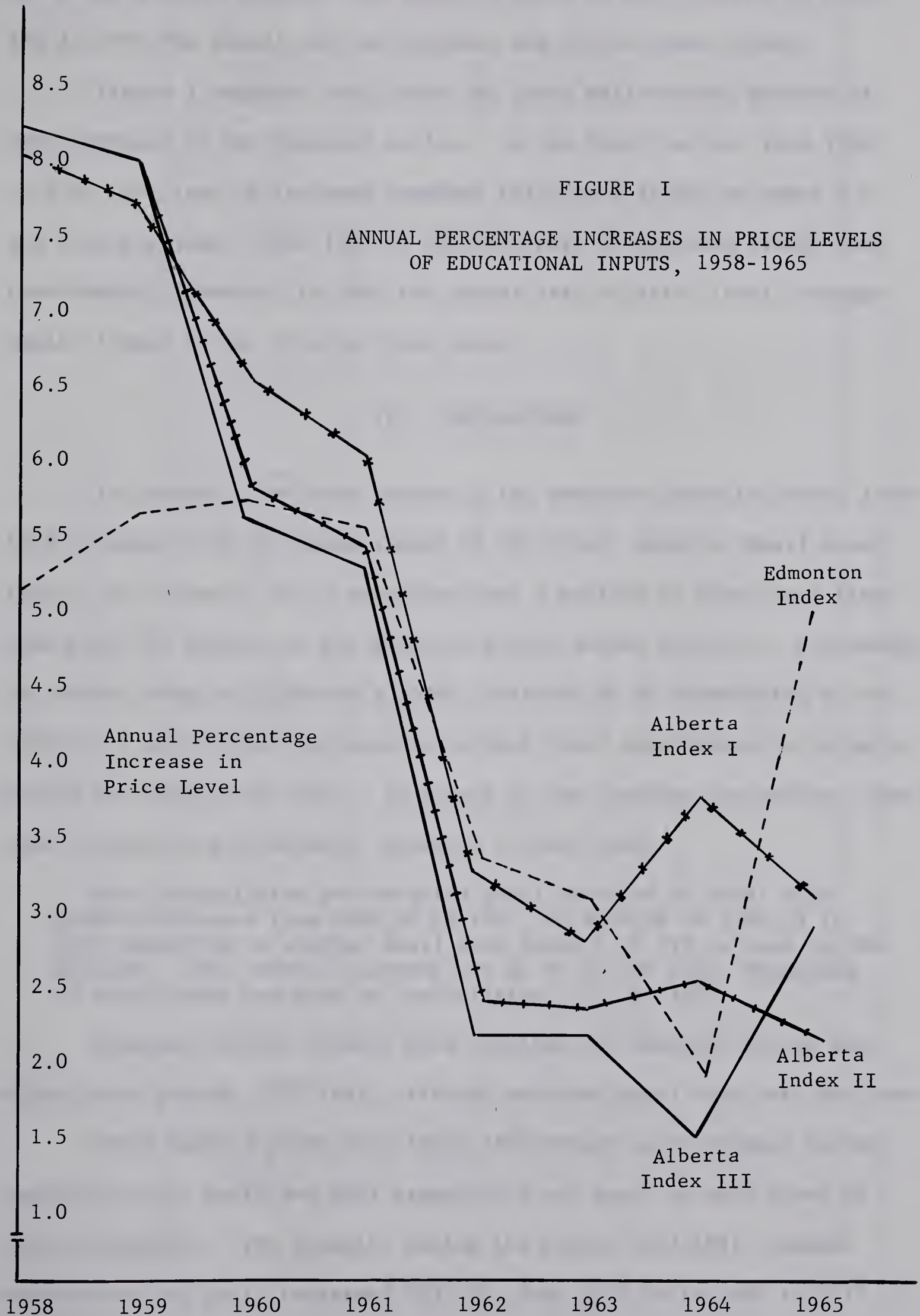
Table XXVII also shows the average rate of increase in the price level of educational goods purchased by the Edmonton Public School Board. The Edmonton Index shows an average increase of 4.40 per cent per year and a total increase of 41.05 per cent for the nine-year period.

It will be noted that the index values of the Edmonton Index are most closely related to the index values of the third Alberta Index. However, it must also be pointed out that although the 1965 index values for both indexes are approximately the same, throughout the period 1958-1964 the index values of the Edmonton Index were consistently three or four points lower than the values of the third Alberta Index. These differences can be attributed to the fact that teachers' salaries in Edmonton did not increase as rapidly as in other parts of Alberta.

Because of the difficulty encountered in describing year-to-year changes in rate increase, it was decided to examine the rate of annual increase for each index by way of a graph. Figure I shows the pattern of price level increases, as indicated by each index, for the period 1958-1965.

The pattern followed by the three Alberta Indexes suggests that until 1963 the annual rate of increase in the price level of educational inputs declined steadily. However, after 1963 the patterns of rate increase for the three Alberta Indexes varied considerably. In 1964, Alberta Indexes I and II showed an increase in rate while Alberta Index III showed a substantial decrease in rate. In 1965 the opposite occurred; Indexes I and II experienced slight decreases in rate while the rate in Index III increased considerably.

The pattern of rate increase for the Edmonton Education Price Index is also shown in Figure I. Again, it can be pointed out that of



the three Alberta Indexes, the Edmonton Index is most similar to Index III in both the annual rate of increase and in the index values.

Figure I suggests that there are three well-defined periods of rate increase in the Edmonton series. In the first period, from 1958 to 1961, the rate of increase remained relatively stable at about 5.5 per cent per year. From 1961 to 1964 the rate of increase slowed down considerably; however, in 1965 the annual rate of price level increase again climbed to the five per cent level.

IV. IMPLICATIONS

In general, the index values of the Edmonton Education Price Index tend to agree with the index values of the third Alberta "Small Area" Index. As a result, it is suggested that a portion of Atherton's findings could be applied to the Edmonton Public School District. For example, the second stage of Atherton's study consisted of an examination of the effects of price level increases on school board expenditures in Alberta during the period 1957-1965. In regard to the findings concerning "small area" authorities in Alberta, Atherton reports that:

Real expenditures per weighted pupil enrolled by small area boards increased from \$184.52 in 1957, to \$223.08 or \$234.23 in 1965 depending on whether Small Area Index I or III is used as the deflator. The overall increase was 21 or 27 per cent, depending on which index was used as the deflator. (1, p. 192)

Somewhat similar results were obtained for Edmonton during the eleven-year period, 1957-1967, although weighted pupil data were not used.

Table XXXVIII shows that large differences exist between current expenditure per pupil and real expenditure per pupil at each level of school operation. For example, during the period 1957-1967, current expenditure per pupil increased \$297.59; from \$279.64 in 1957 to \$577.23

TABLE XXVIII

COMPARATIVE SUMMARY OF PER-PUPIL EXPENDITURE
EDMONTON PUBLIC SCHOOL BOARD, 1957-1967

Year	Elementary		Junior High		Senior High		Average	
	Current Expenditure (1)	Real Expend. (2)	Current Expenditure (3)	Real Expend. (4)	Current Expenditure (5)	Real Expend. (6)	Current Expenditure (7)	Real Expend. (8)
1957	\$237.46	\$237.46	\$297.17	\$297.17	\$454.24	\$454.24	\$279.64	\$279.64
1958	264.48	251.67	335.99	319.72	526.56	501.06	318.04	302.64
1959	287.36	258.88	359.42	323.80	559.98	504.49	346.00	311.71
1960	305.34	260.26	367.14	312.94	617.70	526.51	369.55	314.99
1961	317.02	255.99	391.56	316.18	603.25	487.12	381.93	308.41
1962	320.37	250.37	415.85	324.98	581.33	454.30	387.48	302.81
1963	336.04	254.81	441.73	334.95	575.86	436.65	405.22	307.26
1964	359.59	267.67	464.39	345.68	617.76	459.85	433.03	322.34
1965	384.07	272.29	487.32	345.49	653.43	463.26	460.74	326.65
1966	424.61	290.91	522.49	357.97	747.31	512.00	511.82	350.66
1967	469.78	285.11	606.43	368.05	835.63	507.15	577.23	350.20
Increase	97.84%	20.07%	104.07%	23.85%	83.96%	11.63%	106.41%	23.71%

Source: 1,3,5,⁷ Edmonton Public School Board, Annual Financial Report, 1967, p. 24.

in 1967. During the same period, real expenditure per pupil increased \$70.56; from \$279.64 in 1957 to \$350.20 in 1967. Thus, in Edmonton, for the period 1957-1967, 76.29 per cent of the overall increase in current expenditure per pupil was due to rising price levels. In other words, real increases in per pupil expenditures accounted for 23.71 per cent of the overall increase.

Table XXXVIII also shows that during the period 1957-1967 the greatest increase in real per pupil expenditure occurred at the junior high level, where real per pupil expenditures increased 23.85 per cent. During the eleven-year period, real expenditure per elementary pupil increased 20.07 per cent, and the increase in real expenditure per high school pupil was 11.63 per cent.

It will be noted that although real expenditure per pupil increased at the rate of 2.33 per cent per year for the eleven-year period, the rate of annual increase was not uniform. In 1958, 1964, and 1966 there were substantial increases in the amount of per pupil real expenditure. However, in 1961, 1962, and again in 1967 the amount of real expenditure per pupil decreased.

V. SUMMARY AND CONCLUSIONS

The compilation and comparison of the Edmonton Education Price Index with the Alberta "Small Area" Education Price Indexes makes it possible to report the following generalizations.

(1) The price levels of educational inputs, as measured by the Edmonton Education Price Index, increased 64.77 per cent during the period 1957-1967. This increase represents an average increase of 5.20 per cent per year for the eleven-year period.

(2) In Edmonton, the increase in the price level of teaching services greatly exceeded the increases in the price levels of other educational inputs.

(3) In the period 1957-1967 the price level of teaching services increased by 77.29 per cent; administrative inputs increased by 50.97 per cent; the price level of instructional aids and supplies increased by 32.92 per cent; the price level of operating and maintaining a school plant increased by 36.38 per cent; the price level of transportation inputs increased by 26.48 per cent, and the price level of other educational inputs increased by 28.79 per cent.

(4) Due to the weight placed on the Teachers' Services Subindex, it is unlikely that minor inaccuracies in the price data for other inputs would have significant effects upon the rate of price level change of educational inputs as indicated by the final index values of the Edmonton Education Price Index.

(5) The weights placed on the major subindexes of both the Alberta Education Price Index and the Edmonton Education Price Index were very similar. A detailed comparison is provided on page 39.

(6) In general, it might be concluded that for the period 1957-1967, of the three "small area" indexes compiled by Atherton, the Edmonton Education Price Index corresponds most closely to Alberta Index III both in price relatives and in the rate of average annual price level increase. Thus, one can conclude that the Alberta "Small Area" Education Price Index III would be an appropriate indicator of price level increases of educational inputs purchased by the Edmonton Public School Board for the period 1957-1965.

(7) Generally speaking, the average annual percentage increase in the price levels of educational inputs for each major subindex of the

Edmonton series were closely related to the increases in the price levels of educational inputs indicated by the Alberta Subindexes. The price level for teachers' salaries, plant operation and maintenance inputs, and transportation items increased at a slightly faster rate in the Alberta Index than in the Edmonton Education Index. On the other hand, the Edmonton Index showed greater average increases in the price levels of the following inputs: administration, instructional aids and supplies, and other expenditure items.

(8) Despite relatively large increases in current expenditure in the period 1957-1967, the increases in real expenditure were not as dramatic. Although current expenditures per pupil had increased \$297.59 in the period, increased price levels accounted for all but some \$70.56 (76.29 per cent) of the overall increase. Further investigation revealed that the greatest increase in real expenditure per pupil occurred at the junior high school level, and that the smallest increase occurred at the senior high school level.

REFERENCES FOR CHAPTER V

1. Atherton, P. J. "The Impact of Rising Price Levels on Expenditures for School Operation in Alberta 1957-1965." Unpublished Doctoral dissertation, University of Alberta, Edmonton, 1968.
2. Wasserman, William. Education Price and Quality Indexes. Syracuse: Syracuse University Press, 1963.

CHAPTER VI

SUMMARY, DISCUSSION, AND IMPLICATIONS OF THE FINDINGS

I. INTRODUCTION

The purpose of this chapter is to briefly review the study. The first portion of the chapter will review the purposes of the study and outline the research design that was used. A summary of the major findings will be presented in the second section. The chapter will conclude with a discussion of the implications of the findings and some recommendations for further research.

II. PURPOSES AND DESIGN OF THE STUDY

This study was designed to determine the degree to which changes in the price relatives of the Alberta "Small Area" Education Price Indexes represented the price level changes of educational inputs purchased by the Edmonton Public School Board in the period 1957-1965.

The study was carried out in two stages. The first stage involved developing a price index which measured the price level increases of educational goods and services purchased by the Edmonton Public School Board for the period 1957-1967.

The index compiled for the study consisted of six major subindexes:

1. A teachers' services subindex,
2. An administration subindex,
3. An instructional aids and supplies subindex,
4. A plant operation and maintenance subindex,
5. A transportation subindex,
6. An other expenditures subindex.

The indexes were compiled using fixed weights and a fixed base year. In addition, each index was compiled using Laspeyres' formula.

The weights for the subindexes and the component subindexes were derived from a breakdown of school board expenditures. The necessary data were obtained largely from the 1957 Annual Financial Report of the Edmonton Public School Board.

The price relatives were derived from the prices of various educational goods and services over an eleven-year period and were obtained from a variety of sources.

Price data for teachers' and officials' salaries were derived from the annual reports of the Department of Education. Price data for other labor inputs were obtained from the Edmonton Public School Board, the Labor Relations Board, and from the Alberta Bureau of Statistics Annual Salary and Wage Rate Survey. Price data for educational goods were obtained from various local organizations employed in school supply or were derived from appropriate price series published by the Dominion Bureau of Statistics.

The second stage of the study compared the index values of the Edmonton Education Price Index with the price relatives of the Alberta "Small Area" Education Price Indexes. The comparison was made to determine similarities and differences between the price relatives of the Edmonton Index and the Alberta Indexes for the following subindexes: the Teachers' Services Subindexes, the Administration Subindexes, the Instructional Aids and Supplies Subindexes, the Plant Operation and Maintenances Subindexes, the Transportation Subindexes, and the Other Expenditures Subindexes.

The basis for comparing the indexes was by means of a percentage figure which represented the average annual increase in the price level of educational inputs for the period 1957-1965.

III. SUMMARY OF THE FINDINGS

In general, the study found that for the nine-year period, 1957-1965, increases in the price level of educational goods and services in Edmonton were quite similar to the increases in price levels of educational inputs in "small areas" in Alberta, as indicated by Alberta Index III.

An analysis of the findings of the study make it possible to report the following specific conclusions.

The Final Indexes

For the period 1957-1965, the price level of educational inputs in Edmonton increased by 41.05 per cent. This represents an average annual increase of 4.40 per cent.

According to the Alberta Education Price Indexes, Alberta increased at a faster rate. Alberta Index I indicates that the price level of educational inputs increased 48.82 per cent during the nine-year period, for an average of 5.12 per cent per year. The index values of Alberta Index II showed an average annual increase of 4.56 per cent, and a total increase of 42.61 per cent. Alberta Index III, which was closely related to the Edmonton Index, showed an overall increase of 41.74 per cent and an average annual increase of 4.49 per cent.

The Teachers' Services Subindexes

The Teachers' Services Subindex of the Edmonton series indicated that teachers salaries in Edmonton increased 49.16 per cent for the period 1957-1965. The average rate of increase was 5.24 per cent per year.

Alberta Salary Subindex I showed that for the period 1957-1965 teachers' salaries increased at the rate of 6.10 per cent per year, and increased 60.06 per cent for the entire period.

Salary Subindex II of the Alberta series showed that teachers' salaries increased a total of 51.31 per cent, which is an average increase of 5.37 per cent per year.

The third Salary Subindex of the Alberta series indicated that teachers' salaries increased 5.26 per cent per year, and increased a total of 50.05 per cent for the nine-year period.

The Administration Subindexes

The average annual increase in the price level of administrative inputs for "small areas" in Alberta was 2.32 per cent. The total amount of increase for the nine-year period was 19.99 per cent.

The price level of administrative inputs in Edmonton increased by 3.21 per cent per year, and for the nine-year period increased 28.14 per cent.

The Instructional Aids and Supplies Subindexes

The price level of instructional aids and supplies purchased by small area authorities in Alberta increased 2.36 per cent per year for the period 1957-1965. The total amount of price level increase was 20.44 per cent.

The Instructional Aids and Supplies Subindex of the Edmonton series showed that the price level of instructional supplies increased 2.57 per cent per year, and increased 22.41 per cent for the nine-year period.

The Plant Operation and Maintenance Subindexes

For the period 1957-1965, the annual rate of increase in price levels of plant operation inputs for Edmonton was 2.63 per cent. The average price level increase of the same inputs, for "small areas" in Alberta, was 2.65 per cent per year.

The total price level increase for plant operation inputs during the nine-year period was 23.08 per cent for "small areas" in Alberta, and 23.01 per cent for Edmonton.

The Transportation Subindexes

The average price level increase of transportation inputs in Edmonton was .70 per cent per year; for all "small areas" in Alberta the increase was 2.77 per cent per year.

The overall increase in the price level of transportation inputs for Edmonton was 5.72 per cent; for all "small areas" in Alberta the overall increase was 23.60 per cent.

The Other Expenditures Subindexes

The average rate of increase in the price level of other educational inputs was 2.09 per cent per year for Edmonton. For all "small areas" in Alberta the rate of annual increase was 1.18 per cent.

The total increase in the price level of other educational inputs for "small areas" in Alberta was 9.83 per cent for the period 1957-1965. The total increase for the same inputs in Edmonton was 17.98 per cent.

IV. DISCUSSION OF IMPLICATIONS

In general, the findings of this study tended to agree with Atherton's estimate of the impact of inflation on educational expenditure in Alberta.

Atherton's study, completed in 1968, suggested that during the period 1957-1965 increasing price levels accounted for 82 per cent of the increases in current expenditures per weighted pupil, if Alberta Index I was used as the deflator. If Alberta Index III was used to

deflate current expenditures, the impact of increasing price levels was reduced to 74 per cent of the increased expenditure per weighted pupil (1, p. 179).

The impact of inflation on expenditures of the Edmonton Public School Board was also found to be quite substantial. This study indicated that for the eleven-year period 1957-1965, rising price levels accounted for some 76 per cent of the increases in current expenditures per unweighted pupil.

The degree of correspondence between the rates of price level increases of educational inputs, as indicated by the Alberta Education Price Indexes and the Edmonton Education Price Index, suggests that the impact of inflation on expenditures of other urban school authorities in Alberta may also be quite substantial. It would be interesting to explore in greater depth whether the similarity between the Edmonton Index and the Alberta "Small Area" Indexes is coincidental, or a reflection of a general pattern for all urban areas in Alberta. However, since such an exploration would be dependant upon the successful completion of a number of similar studies, at this time one can merely speculate, with a limited degree of confidence, that the findings of this study may also apply to other urban areas in Alberta.

V. RECOMMENDATIONS FOR FURTHER STUDY

A number of possibilities for further investigation arise from this study. The following are presented for consideration.

1. A study which would examine in detail the effects of price level increases, as measured by the Edmonton Education Price Index, on expenditures of the Edmonton Public School Board for the period 1957-1967.

2. A study which would examine the increases in the price level of educational inputs, as indicated by the results of this study, in relation to the sources of school board revenue.

3. A study which would involve compiling educational price indexes for other large urban school systems in Canada, to determine if the rate of increase in the price level of educational inputs is uniform in various geographic regions.

4. Finally, it is suggested that a follow-up study be conducted so that the Edmonton Education Price Index will be kept current. If this is done, long term trends in the movement of educational price levels could be established, which would be beneficial in projecting future school board expenditures and in determining which area or areas of school operation require additional expenditure.

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TABLE 10

ADMINISTRATIVE EXPENDITURES
BY STATE, 1960-1969

State	1960		1961		1962		Total
	Actual	Estimated	Actual	Estimated	Actual	Estimated	
Alabama	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
Alaska	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
Arizona	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
Arkansas	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
California	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
Colorado	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
Connecticut	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
Delaware	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
Florida	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
Georgia	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
Hawaii	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
Idaho	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
Illinois	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
Indiana	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
Iowa	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
Kansas	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
Kentucky	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
Louisiana	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
Maine	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
Maryland	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
Massachusetts	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
Michigan	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
Minnesota	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
Mississippi	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
Missouri	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
Montana	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
Nebraska	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
Nevada	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
New Hampshire	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
New Jersey	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
New Mexico	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
New York	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
North Carolina	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
North Dakota	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
Ohio	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
Oklahoma	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
Oregon	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
Pennsylvania	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
Rhode Island	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
South Carolina	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
South Dakota	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
Tennessee	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
Texas	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
Utah	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
Vermont	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
Virginia	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
Washington	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
West Virginia	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
Wisconsin	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000
Wyoming	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	3,000,000

APPENDIX A

DATA FOR ADMINISTRATION SUBINDEX

Source: Bureau of Economic Analysis, Department of Commerce, Office of Economic Research, "Administrative Expenditures by State, 1960-1969," *Monthly Labor Review*, Vol. 92, No. 1, January 1969, pp. 1-10.

TABLE XXIX
DETAILS OF CONSTRUCTION OF COMMUNICATION
COMPONENT SUBINDEX

	Postage		Telephone		Telegraph		
Weight	.25		.70		.05		
Year	P.R. (1)	W.P.R. (2)	P.R. (3)	W.P.R. (4)	P.R. (5)	W.P.R. (6)	Subindex (7)
1957	100.00	25.00	100.00	70.00	100.00	5.00	100.00
1958	100.00	25.00	100.00	70.00	100.00	5.00	100.00
1959	100.00	25.00	100.00	70.00	100.00	5.00	100.00
1960	100.00	25.00	100.00	70.00	100.00	5.00	100.00
1961	100.00	25.00	100.00	70.00	126.63	6.33	101.33
1962	100.00	25.00	100.00	70.00	126.63	6.33	101.33
1963	100.00	25.00	100.00	70.00	126.63	6.33	101.33
1964	100.00	25.00	100.00	70.00	126.63	6.33	101.33
1965	100.00	25.00	100.00	70.00	126.63	6.33	101.33
1966	100.00	25.00	100.00	70.00	126.63	6.33	101.33
1967	100.00	25.00	100.00	70.00	154.63	7.73	102.73

Source: ⁵Computed from Rate Sheets, Canadian National Communications.

APPENDIX B

DATA FOR INSTRUCTIONAL AIDS AND SUPPLIES SUBINDEX

TABLE XXX
DETAILS OF CONSTRUCTION OF PRICE SUBINDEX FOR BOOK
COMPONENT OF INSTRUCTIONAL SUPPLIES SUBINDEX

Title of Book	Price of Book in Each Year of Series										
	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
<u>Textbooks</u>											
Friends and Neighbours	\$1.70	\$1.75	\$1.75	\$1.90	\$1.90	\$1.90	\$2.00	\$2.10	\$2.20	\$2.30	\$2.20
Streets and Roads	1.85	1.95	1.95	2.10	2.10	2.10	2.20	2.30	2.35	2.40	2.30
Canada and Her Neighbours	3.00	3.00	3.00	3.10	3.20	3.20	3.20	3.20	3.30	3.30	3.40
Canada in the Western World	2.75	2.75	2.75	3.00	3.50	3.50	3.50	3.50	3.50	4.00	4.00
Business Fundamentals	2.60	2.60	2.60	2.85	2.85	3.00	3.00	3.00	3.10	3.20	3.35
Canada in the Modern World	2.95	2.95	2.95	3.20	3.25	3.30	3.30	3.40	3.45	3.50	3.50
Thorndike-Barnhart H.S. Dictionary	4.95	4.95	4.95	5.15	5.30	5.40	5.70	5.75	5.80	5.95	5.90
Webster's Elementary Dictionary	3.65	3.65	3.65	3.60	3.60	3.60	3.60	3.60	3.60	4.90	4.90
Pupils Own Vocabulary Speller	1.45	1.45	1.45	1.60	1.60	1.65	1.75	1.75	1.75	2.00	2.00
Words and Ideas, Book II	2.00	2.00	2.00	2.00	2.10	2.10	2.25	2.35	2.50	2.60	2.60
Cost of Collection	26.90	27.05	27.05	28.50	29.40	29.75	30.50	30.95	30.95	34.15	34.15
Price Relatives	100.0	100.6	100.6	105.9	109.2	110.5	113.4	115.1	117.3	126.9	126.9
<u>Supplementary Readers</u>											
"B" is for Betty	3.50	3.50	3.50	3.50	4.25	4.25	4.25	4.25	4.25	4.25	3.30
Little Toot	3.00	3.00	3.25	3.50	3.50	3.75	3.75	4.10	4.10	3.35	2.95
Beau Geste	1.65	1.95	1.95	1.95	2.00	2.00	2.25	2.25	2.25	2.25	2.15
My Friend Flicka	2.00	3.05	2.50	2.50	2.50	3.00	3.75	3.50	3.50	3.50	2.95
Cost of Collection	10.15	11.50	11.20	11.45	11.50	13.00	14.00	14.10	14.10	13.35	11.35
Price Relatives	100.0	113.3	110.3	112.8	113.3	128.0	137.9	138.9	138.9	131.5	123.9
Weighted Price Relatives	80.0	80.4	80.4	84.7	87.4	88.5	90.7	92.0	93.8	101.6	101.6
Weighted Price Relatives	20.0	22.7	22.7	22.6	22.7	25.6	27.6	27.8	27.8	26.3	22.3
Price Subindex	100.0	103.1	103.1	107.3	110.1	114.1	118.3	119.8	121.6	127.9	123.9

Source: Government of Alberta, Department of Education, School Book Branch.

TABLE XXXI
INSTRUCTIONAL SUPPLIES PRICE DATA

Year	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
Furniture											
a) Teachers' Desks	\$81.00	\$81.00	\$81.00	\$81.00	\$85.00	\$91.00	\$91.00	\$91.00	\$91.00	\$104.50	\$104.50
b) Stud. Desks	28.00	28.00	28.00	28.00	28.00	28.00	28.00	23.75	23.75	23.75	23.75
Chalkboard											
a) Hyllo. sf.	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75
b) Cork sf.	.60	.60	.60	.60	.60	.60	.60	.60	.60	.60	.60
Maps and Globes											
a) LSR Maps	19.75	19.75	19.75	19.75	19.75	19.75	19.75	20.25	20.25	20.25	23.75
b) Chlg Globes	11.75	11.75	11.75	11.75	11.75	11.75	11.75	12.75	12.75	13.25	14.95
Machines											
a) Duplicator	250.00	255.00	255.00	255.00	255.00	255.00	275.00	275.00	275.00	275.00	259.50
b) Projector	89.95	89.95	89.95	89.95	90.50	90.50	90.50	99.00	99.00	107.00	107.00
General Supplies											
a) Dup. Paper											
8½ x 11, 18#	2.95	2.95	3.95	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.05
b) Place Value Chart	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	6.35

Sources: Atherton, P. J. "The Impact of Rising Price Levels on Expenditures for School Operation in Alberta, 1957-1965." Unpublished Doctoral dissertation, University of Alberta, Edmonton, 1968, p. 246.

Moyer Division, Vilas Industries Limited, Edmonton Alberta.

TABLE XXXII

DETAILS OF CONSTRUCTION OF PRICE SUBINDEX FOR SUPPLIES AND EQUIPMENT
COMPONENT OF INSTRUCTIONAL SUPPLIES SUBINDEX

Item and Weight	Price Relatives for Each Year of Series										
	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
<u>Furniture (Weight .18)</u>											
Teachers' Desks	100.0	100.0	100.0	100.0	104.9	112.2	112.2	112.2	112.2	129.0	142.6
Students' Desks	100.0	100.0	100.0	100.0	100.0	100.0	100.0	84.8	84.8	84.8	84.8
Average	100.0	100.0	100.0	100.0	102.5	106.1	106.1	98.5	98.5	106.9	113.7
Weighted Price Relative	18.0	18.0	18.0	18.0	18.4	19.1	19.1	17.7	17.7	19.2	20.5
<u>Chalkboard (Weight .09)</u>											
Weighted Price Relative	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
<u>Maps and Globes (Weight .04)</u>											
Maps	100.0	100.0	100.0	100.0	100.0	100.0	100.0	102.5	102.5	102.5	120.2
Globes	100.0	100.0	100.0	100.0	100.0	100.0	108.5	108.5	112.8	112.8	127.2
Average	100.0	100.0	100.0	100.0	100.0	100.0	104.3	105.5	107.6	107.6	123.7
Weighted Price Relative	4.0	4.0	4.0	4.0	4.0	4.0	4.2	4.2	4.3	4.3	4.9
<u>Machines (Weight .07)</u>											
Duplicators	100.0	102.0	102.0	102.0	102.0	102.0	110.0	110.0	110.0	110.0	103.8
Projectors	100.0	100.0	100.0	100.0	100.6	100.6	100.6	110.0	110.0	118.9	144.5
Average	100.0	101.0	101.0	101.0	101.3	101.3	105.3	110.0	110.0	114.5	124.2
Weighted Price Relative	7.0	7.0	7.0	7.0	7.0	7.0	7.4	7.7	7.7	8.0	8.7
<u>Supplies (Weight .62)</u>											
Paper	100.0	100.0	133.9	137.3	137.3	137.3	137.3	137.3	137.3	137.3	137.3
Charts	100.0	100.0	100.0	100.0	100.0	100.0	100.0	120.0	120.0	120.0	141.1
Average	100.0	100.0	116.9	118.6	118.6	118.6	118.6	128.6	128.6	128.6	139.2
Weighted Price Relative	62.0	62.0	72.5	73.6	73.6	73.6	73.6	79.8	79.8	79.8	86.3
Sum of Weighted Price Relatives	100.0	100.0	110.6	111.6	112.1	112.8	113.2	118.4	118.5	120.3	129.4

Source: Computed from Table XXXI.

TABLE XXXIII

PRICE DATA AND PRICE RELATIVES FOR THE SCHOOL STENOGRAPHER
 COMPONENT OF INSTRUCTIONAL SUPPLIES SUBINDEX

Year	Junior Clerk (1)	Intermediate Clerk (2)	Average Salary (3)	Component Subindex (4)
1957	\$168	\$209	\$188.50	100.00
1958	181	226	203.50	107.96
1959	187	229	208.00	110.34
1960	187	238	212.50	112.73
1961	202	250	226.00	119.89
1962	197	247	222.00	117.77
1963	205	248	226.50	120.16
1964	211	260	235.50	124.93
1965	224	270	247.00	131.03
1966	232	285	258.50	137.14
1967	258	312	285.00	151.19

Sources: ^{1,3}Alberta Bureau of Statistics, Salary and Wage Rate Survey, Alberta, 1957-1967.

1. The purpose of this document is to provide a summary of the data for plant operation and maintenance subindex.

2. The data is presented in the following table:

The data is presented in the following table:

Item	Value
1. The purpose of this document is to provide a summary of the data for plant operation and maintenance subindex.	1.0
2. The data is presented in the following table:	2.0
3. The data is presented in the following table:	3.0
4. The data is presented in the following table:	4.0
5. The data is presented in the following table:	5.0
6. The data is presented in the following table:	6.0
7. The data is presented in the following table:	7.0
8. The data is presented in the following table:	8.0
9. The data is presented in the following table:	9.0
10. The data is presented in the following table:	10.0

APPENDIX C

DATA FOR PLANT OPERATION AND MAINTENANCE SUBINDEX

1.0	1.0
2.0	2.0
3.0	3.0
4.0	4.0
5.0	5.0
6.0	6.0
7.0	7.0
8.0	8.0
9.0	9.0
10.0	10.0

The data is presented in the following table:

1.0

2.0

#5, 10650 - 110 Street,
Edmonton 17, Alberta.

Manager,
Mid-West Supplies,
14420-118 Avenue,
Edmonton.

Dear Sir:

I am a graduate student enrolled at the University of Alberta, presently compiling a price index which will measure the effects of rising price levels on the Edmonton Public School Board's expenditures.

In order to complete this study, I require some information concerning price changes of caretakers' supplies. Due to the variety of caretaking commodities and the difficulty of obtaining price data for each commodity, for each year, 1957-1967, it was decided to utilize the Industry Selling Price Index of the "Soaps, washing compounds and cleaning preparations Industry" as an indicator of price changes for caretaking supplies purchased by the Edmonton Public School Board.

The price relatives of this index are as follows:

1957	100.0
1958	104.3
1959	108.5
1960	110.4
1961	110.7
1962	110.6
1963	110.9
1964	111.9
1965	114.4
1966	110.1
1967	112.4

It would be greatly appreciated if you could inform me if, in your opinion, the price relatives of this index are representative of the price changes of caretaking supplies.

Yours sincerely,

Kent Ackroyd

MID-WEST SUPPLIES
14420-118th Avenue
Edmonton, Alberta

March 14, 1969

Mr. Kent Ackroyd,
#5, 10650-110 Street,
Edmonton 17, Alberta.

Dear Mr. Ackroyd:

Re your letter March 5, 1969 with regard to price data. According to your figures outlined in your letter they seem reasonable as far as we can tell.

Yours very truly,

L. Hudson (Mrs.)
Office Manager

EDMONTON POWER
Edmonton, Alberta

File: CS-6 (a)

January 8th, 1969.

Mr. Kent Ackroyd,
#5, 10650-110 Street,
Edmonton 17, Alberta.

Dear Sir:

With reference to your telephone request of January 7th 1969, we are enclosing copies of our Commercial Rate schedules which were in effect from 1957 to the present time. We are also enclosing a summary of load factors for schools which may be used to calculate consumptions as required.

I trust that this information should be satisfactory, but if further questions should arise, please feel free to contact us.

Yours truly,

EDMONTON POWER

D. Yaremko,
Cost Analysis Clerk.

dy;ms

COMMERCIAL POWER RATE 1957

First 100 K.W. hours per month at 4 cents per K.W. Hour.
 Next 500 K.W. hours per month at 3½ cents per K.W. Hour.
 Over 600 K.W. hours at 2 cents per K.W. Hour.
 Minimum charge \$2.00 per month.

COMMERCIAL POWER RATE 1960

First 40 Hrs. of use of KVA of Demand @ 2.4¢ per K.W. Hour.
 Next 50 Hrs. of use of KVA of Demand @ 1.2¢ per K.W. Hour.
 Next 50 Hrs. of use of KVA of Demand @ 1.1¢ per K.W. Hour.
 Next 175 Hrs. of use of KVA of Demand @ 1.0¢ per K.W. Hour.
 Over 315 Hrs. of use of KVA of Demand @ 0.9¢ per K.W. Hour.

COMMERCIAL POWER RATE 1964

First 130 K.W. Hours per KVA of Demand @ \$2.00 per KVA of Demand.
 The Balance of the K.W. Hours consumed according to the following formula:

$$\frac{5,000}{3,500 + \text{KVA Demand}} \times 0.75\text{¢} \times \text{Balance K.W. Hours}$$

COMMERCIAL POWER RATE 1967

First 124 K.W. Hours per KVA of Demand at \$2.00 per KVA of Demand.
 The Balance of the K.W. Hours according to the following formula:

$$\frac{5,000}{2,675 + \text{KVA Demand}} \times 0.5\text{¢} \times \text{Balance K.W. Hours}$$

The average monthly load factor for institutions without residences is 22.09 per cent.

To calculate the monthly power consumption of an average-sized school, Mr. Yaremko suggested using a demand of 3.5 watts per square foot of floor area.

Mr. A. C. Roberts, Director of Construction, Edmonton Public School Board, stated in a personal conversation that he felt that the floor area of an average-sized school would be approximately 45,000 square feet.

Therefore, the monthly power consumption of an average-sized

school was calculated as follows:

Floor Area: 45,000 square feet

Demand: $45,000 \times 3.5 \text{ watts} \div 1000 = 157.5 \text{ Kilowatts}$

Consumption: $157.5 \text{ K.W.} \times 730 \text{ hours per month} \times 22.09\% = 25,398 \text{ K.W.H.}$

TABLE XXXIV

PRICE DATA AND PRICE RELATIVES FOR THE POWER
COMPONENT OF THE PLANT OPERATION SUBINDEX

Year	Monthly Consumption in Kilowatt Hours	Cost	Price Relative
1957	25,398	\$517.46	100.00
1960	25,398	365.81	70.69
1964	25,398	365.71	70.67
1967	25,398	366.64	70.85

PRICE DATA ON WATER RATES¹

Water Rates Prior to December 1961

<u>Consumption</u>	<u>Price Structure</u>
Less than 400 cu. ft.	\$1.72 minimum charge
400 - 800 cu. ft.	43¢ per 100 cu. ft.
800 - 860 cu. ft.	\$3.44 minimum charge
860 - 1800 cu. ft.	40¢ per 100 cu. ft.
1800 - 1940 cu. ft.	\$7.20 minimum charge
1940 - 4000 cu. ft.	37¢ per 100 cu. ft.
4000 - 4350 cu. ft.	\$14.80 minimum charge
4350 - 7000 cu. ft.	34¢ per 100 cu. ft.
7000 - 7670 cu. ft.	\$23.80 minimum charge
7670 - 13,600 cu. ft.	31¢ per 100 cu. ft.
13,600 - 14,530 cu. ft.	\$42.16 minimum charge

For the purposes of this study it is not necessary to present the remaining portion of the rate structure.

Water Rates Effective December, 1961

<u>Consumption</u>	<u>Price Structure</u>
First 800 cu. ft.	43¢ per 100 cu. ft.
next 3200 cu. ft.	34.3¢ per 100 cu. ft.
next 3500 cu. ft.	28.2¢ per 100 cu. ft.
next 17500 cu. ft.	26.8¢ per 100 cu. ft.
next 475000 cu. ft.	22.4¢ per 100 cu. ft.
next 1000000 cu. ft.	21.0¢ per 100 cu. ft.
over 1500000 cu. ft.	17.5¢ per 100 cu. ft.

John Ferguson, Meters Record and Control Clerk, Water Department, City of Edmonton, by taking a sample of four schools (Oliver, McDougall, McKee, Richard Secord) estimated the average monthly water consumption per school to be approximately 8500 cubic feet. By using the rate structures outlined above, 8500 cubic feet of water would have cost \$26.35 in 1957, \$26.97 in December of 1961.

¹Rates obtained from Bob Adair, Assistant Superintendent of Consumer Service, Water Department, City of Edmonton.

Based upon the above price data, the price relatives of the water index would be: (1) from 1957 through 1961 - 100.00, and (2) from 1962 through 1967 - 102.35.

TABLE XXXV
DETAILS OF CONSTRUCTION OF REPAIRS COMPONENT
OF PLANT OPERATION SUBINDEX

Materials			Labor		
Weight	(.6166)		(.3834)		
Year	Price Rel. (1)	Wtd. P.R. (2)	Price Rel. (3)	Wtd. P.R. (4)	Com. Sub- index (5)
1957	100.0	61.66	100.0	38.34	100.00
1958	99.8	61.53	106.6	40.86	102.39
1959	101.3	62.46	112.6	43.17	105.63
1960	101.8	62.77	120.0	46.00	108.44
1961	100.8	62.15	122.6	47.00	109.15
1962	101.5	62.58	128.7	49.34	111.92
1963	103.9	64.06	131.7	50.49	114.55
1964	107.4	66.22	137.8	52.83	119.05
1965	112.9	69.61	144.6	55.44	125.05
1966	116.2	71.65	156.0	59.81	131.46
1967	118.6	73.13	171.6	65.79	138.92

Sources: ¹Dominion Bureau of Statistics, Non-Residential Building Materials Index.

³Dominion Bureau of Statistics, Construction Wage Index.

APPENDIX D

DATA FOR OTHER EXPENDITURES SUBINDEX

EDMONTON PUBLIC SCHOOL BOARD
10010-107A Avenue
Edmonton, Alberta

January 7, 1969.

Mr. K. Ackroyd,
10650-110 Street, Apt. #5,
Edmonton, Alberta.

Dear Sir:

Re: 1957 Insurance Rates - Fire and General

We have checked our files and are able to inform you that the rate paid by the Edmonton Public School Board for the three-year period January 1, 1957 to January 1, 1960 was seventeen and one-half cents (.175) per \$100.00 of coverage.

The rate paid by the School Board for the period 1960-1967 was seventeen cents (.170) per \$100.00 of coverage.

Yours truly,

EDMONTON PUBLIC SCHOOL BOARD

William H. Boyce,
Director - Accounting & Budget

WHB/sm

ANNUAL REPORT OF THE COMMISSIONER OF THE GENERAL LAND OFFICE

1900-1901

THE COMMISSIONER OF THE GENERAL LAND OFFICE
HON. JAMES D. COOPER
HON. JAMES D. COOPER
HON. JAMES D. COOPER

1900-1901

The following is a list of the names of the persons who have been appointed to the various positions in the General Land Office during the year 1900-1901. The names are given in alphabetical order, and the positions are given in parentheses. The names of the persons who have been appointed to the positions of Assistant Commissioner and Deputy Commissioner are given in italics. The names of the persons who have been appointed to the positions of Surveyor and Assessor are given in bold type. The names of the persons who have been appointed to the positions of Clerk and Stenographer are given in small type. The names of the persons who have been appointed to the positions of Engineer and Draftsman are given in large type. The names of the persons who have been appointed to the positions of Inspector and Watchman are given in medium type. The names of the persons who have been appointed to the positions of Messenger and Janitor are given in small type. The names of the persons who have been appointed to the positions of Cook and Baker are given in small type. The names of the persons who have been appointed to the positions of Porter and Watchman are given in small type. The names of the persons who have been appointed to the positions of Messenger and Janitor are given in small type. The names of the persons who have been appointed to the positions of Cook and Baker are given in small type. The names of the persons who have been appointed to the positions of Porter and Watchman are given in small type.

APPENDIX E

CORRESPONDENCE WITH DOMINION BUREAU OF STATISTICS

THE COMMISSIONER OF THE GENERAL LAND OFFICE
HON. JAMES D. COOPER
HON. JAMES D. COOPER
HON. JAMES D. COOPER

DOMINION BUREAU OF STATISTICS
Ottawa, Canada

February 4, 1969.

Mr. Kent Ackroyd,
Dept. of Educational Administration,
University of Alberta,
10650-110 Street,
Edmonton 17, Alta.

Dear Mr. Ackroyd:

As requested in your letter dated January 24, 1969, I am enclosing a table showing the annual average price relatives, from 1957 to 1967, for the Non-residential Building Materials Index; the Construction Wage Index; the Wholesale Price Index for Fully and Chiefly Manufactured Goods; and several components of the automobile operation group of the Consumer Price Index.

The price relatives for the automobile operation group apply to the City of Edmonton. The other indexes are not compiled at a regional city level, but represent the national averages.

If I can be of any further assistance, please feel free to write again.

Yours very truly,

R. H. Bradley, Chief,
For Retail Prices Section,
Prices Division.

Encl.

YEAR	PRICE RELATIVES					
	Non-residential Building Materials Index		Construction Wage Index		Fully and Chiefly Manufactured Goods	
	(1949=100)	(1957=100)	(1949=100)	(1957=100)	(1935-39=100)	(1957=100)
1957	130.0	100.0	162.9	100.0	237.9	100.0
1958	129.8	99.8	173.6	106.6	238.3	100.2
1959	131.7	101.3	183.4	112.6	241.6	101.6
1960	132.3	101.8	195.5	120.0	242.2	101.8
1961	131.1	100.8	199.7	122.6	244.5	102.8
1962	131.9	101.5	209.7	128.7	249.0	104.7
1963	135.1	103.9	214.6	131.7	254.2	106.8
1964	139.6	107.4	224.5	137.8	256.4	107.8
1965	146.8	112.9	235.5	144.6	261.3	109.8
1966	151.0	116.2	254.2	156.0	268.6	112.9
1967	154.2	118.6	279.5	171.6	274.2	115.2
<hr/>						
	Tires	Chassis Lubrication	Fender Replacement (1957=100)	Brake Relining	Muffler Replacement	
1957	100.0	100.0	100.0	100.0	100.0	
1958	99.7	101.4	109.5	101.5	105.5	
1959	101.7	101.4	113.5	104.9	109.2	
1960	107.8	101.4	118.0	104.8	111.4	
1961	113.5	101.4	118.1	104.4	112.1	
1962	107.8	100.0	120.1	107.4	109.3	
1963	111.5	97.3	125.4	104.5	100.1	
1964	113.9	98.4	128.4	104.6	98.4	
1965	119.6	98.4	136.4	107.9	100.8	
1966	126.3	99.2	143.0	111.8	106.6	
1967	134.5	106.3	153.1	119.6	115.9	

DOMINION BUREAU OF STATISTICS
Ottawa, Canada

March 19, 1969

Mr. Kent Ackroyd,
10650 - 110 Street, #5,
Edmonton 17, Alberta.

Dear Mr. Ackroyd:

This is in response to your letter dated March 5, 1969.

There is very little reason to suspect that the movement of whole-sale prices for fully and chiefly manufactured goods and for non-residential building materials would be significantly different in Edmonton than elsewhere in Canada; however, changes in provincial taxes could alter the relative movements between national and regional prices.

With regard to the construction wage index, there is some evidence that wage rates have not increased as rapidly in Edmonton as they have in Central Canada, although data in this area is not complete.

If you have any further queries concerning prices and price indexes other than at the retail level, the person to contact would be Miss B. J. Emery, Chief, Industrial Prices Section, Prices Division.

Yours very truly,

R. H. Bradley, Chief
Retail Prices Section
PRICES DIVISION

B29916